MARCH 19, 1942

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MARCH 19, 1942

VOL. 149, NO. 12



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This Week in ...

THE IRON AGE-

Editorial

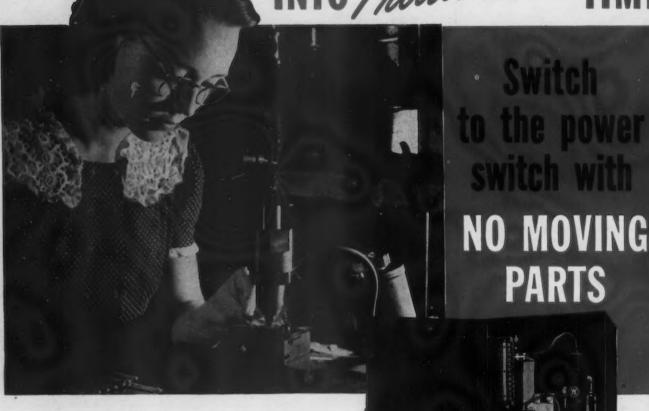
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THE IRON AGE

MARCH 19, 1942

ESTABLISHED 1855

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Shush! Shush!

WHETHER a given chemical compound is a life saving remedy or a deadly poison depends, very largely, upon how it is prescribed. And this same thought applies to censorship of the business and industrial press.

The Iron Age, let me say, has absolutely no complaint to make as to the exercise of censorship, to date, in connection with what we have published or attempted to publish. As a matter of fact, we ourselves determined to take the bull by the horns and whatever we have omitted from our columns since Pearl Harbor, has been of our own volition and not from mandate.

That, as we understand it, is just what the Office of Censorship wants done. It wants every editor to be a good American. And a good American is certainly going to help his country to the best of his ability.

Now, so far as the technical press of America is concerned, there are two ways to do that. One way is to keep helpful information from the enemy; the other is to furnish helpful information to American industry.

At first sight this seems like an impossible straddle, doesn't it? But after you analyze it, the situation is not at all anomalous.

The present Axis assets are their great usage of their total industrial capacity for war purposes, plus their long term experience in making munitions. These assets of theirs are now almost fully capitalized.

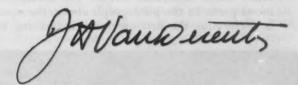
The future asset of America lies in our great number of manufacturing plants not yet making munitions but which should be and will be making them. A far larger potential asset, this, than the Axis powers can hope to marshal.

The liability which we carry at present is the widespread lack of experience on the part of our manufacturers in making the tools of war. As compared to the industrialists and workers of Germany and Japan, we are beginners and babes in the woods.

The big job ahead of us, if we are to realize our war assets, is to get the average American industrialist to know as much about the technique of munition making as Germany and Japan already know. And there is no better, quicker or more practical way to do just this than through the services of the business, industrial and technical press of America.

That was the philosophy and the policy of our government during the last war. It gave our technical editors the "run" of our arsenals and munition making plants and encouraged them to publish, in detail, the "how" of munition making. It even allowed these publications precious cargo space on transatlantic ships so that this information could be carried to our allies.

I think that realistic censorship must weigh the good that publication may do against the evil that it may do. And that with the present comparative states of war art possessed by Germany and Japan as compared to ours, it would be as unsensible to suppress information that most of us need just because a few Germans or Japs may not have it, as it would be to close the kindergarten because some enemy high school senior had possibly neglected to learn how to spell cat.





Forming pockets in Inland sheets is the first operation in making heads for 5-gal. containers.

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Deft fingers—gentle fingers—trained to the feel of cotton, wool and silk—are now working with steel to supply many of the needs for victory. Throughout all the free countries of the world, women are taking the places in the metal working industry left vacant by men who are moving to the fighting front.

Here in America, thousands of women are cutting steel on lathes, millers, grinders, and drilling machines. Others are inspecting, welding, and assembling equipment ranging from delicate instruments to tough jeep cars.

Many other American women are making sheet metal parts. In the photograph above, the operator is performing the first operation in making heads for 5-gal. containers used in transporting fuel, oil and other vital materials for the war program. Pockets are being formed at the rate of 1400 per hour in 24 gauge Inland cold rolled sheets, with hardness of 35/40 Rockwell, B scale. Each pocket, formed by one press stroke, is 3-1/4 in. in diameter, 9/16 in. deep, with a pierced 1/2-in. hole. These 26-in. by 26-in. sheets are coated by lithography before forming. Wax applied to the coated side, which is placed on the lower die, serves as a lubricant as well as to protect the coating. Breakage of these Inland sheets is negligible.

Just as all of America is proud of its women in war work, so Inland is proud of its part in supplying the steel from which they are making "victory" products.

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Fuel Effects on Controlled Atmosphere Furnaces

By F. A. LOCKE Syracuse, N. Y.

A T the present time much emphasis is being placed upon the use of controlled atmospheres to surround steels being treated at elevated temperatures. Most of the recent literature concerning the protection of steel at high temperatures has dealt with the application of a separately produced atmosphere used in a sealed container or retort. However, many processes, involving steel at elevated temperatures, do not lend themselves readily to the use of controlled atmospheres for one or more of the following reasons:

 The operation is not a finishing operation. A good example is billet heating furnaces for rolling mills.

(2) The initial cost and operating cost of controlled atmosphere equipment is not warranted in the processing of some products.

(3) The product being heated is too large or unwieldy to be readily adaptable to treatment in sealed containers.

(4) The design or size of furnace will not permit the use of a sealed container or retort.

Thus, the age-old problem of decarburization and, occasionally, carburization of steel, when heating by open or direct-firing, still exists.

Research in the past decade has

. . . The effects of gaseous, liquid, and solid fuels, as well as other factors, on the amount and rate of carburization and decarburization of steel in controlled atmosphere and regular heating furnaces are described herein.

established the actions of the various components of the atmospheres surrounding the steel being treated by open firing, wherein the products of combustion of the fuel being used come in direct contact with the steel. Table I lists tendencies, with respect to carburization and decarburization, of the more common components of open-fired atmospheres.

The proportion in which any one or any combination of the gases shown in Table I is present determines the ultimate action of any atmosphere. A great volume of work has been done, making available data and curves showing the effects of various ratios of H₂O:H₂ and CO₂:CO. This discussion, however, will be directed more toward the ability of various fuels to change the surface carbon of the steel when used in open-firing, rather than the actions of various concentrations of the above gases.

The atmosphere produced by burning any of the fuels shown in Table II is dependent upon the degree of combustion and the initial composition of the fuel. Table II lists the products of combustion produced by theoretical complete combustion of the various fuels. The degree of combustion, when burning any given fuel, is determined by the proportions of fuel and air present and the amount of atomization of the fuel. This is, of course, assuming correct furnace conditions, such as correct type and size combustion chamber, adequate flue area, etc. In the case of correct proportions of air and fuel, the degree of combustion is dependent upon the amount and ease of atomization of the fuel. Atomization is the intimate contact of particles of air (oxygen) with the particles of the fuel being combusted. Gaseous fuels lend themselves most readily to this atomization, with liquid fuels, such as fuel oil, being more difficult, and solid fuels, such as coal, being the most difficult to atomize. Pulverized coal is atomized relatively easily when stoker-fired. Thus, complete combustion is obtained comparatively easily with gaseous fuels, and is increasingly more difficult to achieve with liquid and solid fuels.

The atmospheres produced by burning any of these fuels will inherit these combustion character-

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istics. The atmosphere produced by the combustion of a solid fuel will possibly contain some unburned fuel, such as particles of carbon and carbon monoxide gas, while the atmosphere produced by burning a liquid or gaseous fuel will probably contain the products of complete combustion, that is, water vapor and carbon dioxide.

The chemical composition of the fuel is the other important factor in determining the types of atmospheres produced by the combustion of any of these fuels. Combustion of hydrogen produces water vapor, which has greater decarburizing power than carbon dioxide produced by the complete combustion of carbon. Thus, any fuel having a relatively high hydrogen content, either molecular or combined, will probably produce a decarburizing atmosphere.

From the information given in Tables I and II, it is possible to predict the type of atmosphere that will be produced by the combustion of any of these fuels, and also the effect it will have with respect to carburization and decarburization on the surface of the steel being heated. By grouping the fuels into three classes, namely, gaseous, liquid and solid, it is possible to predict with con-

siderable accuracy the effect produced by each class.

Gaseous Fuels

Gaseous fuels comprise the first section of Table II. The first two fuels of this class, natural gas and coke oven gas, contain relatively large amounts of hydrogen. Natural gas is approximately twothirds hydrogen by volume. Combustion of these two gases will tend to produce decarburizing atmospheres for two reasons: (1) Combustion of the large amount of hydrogen will produce large amounts of water vapor and possibly some moist hydrogen, and, (2) these fuels, being easily atomized, will produce mainly products of complete combustion, that is, water vapor and carbon dioxide.

The other two fuels of this class, anthracite and bituminous producer gas, will atomize easily and produce mainly products of

TABLE I
Carburization and Decarburization
Tendencies in Furnaces

Carburizing
Carbon Monoxide, CO
Hydrogan, Barbon, CH4, etc.
Water vapor, H2O
Carbon, soot

Carbon doxide, CO2
Oxygen, O2

complete combustion. However, since the hydrogen content of these two gases is comparatively low, only a small amount of water vapor will be produced, and thus the atmospheres produced by the combustion of these two fuels will be less decarburizing than those produced by the first two fuels of this class.

Liquid Fuels

Fuel oil is the main item to be considered in the liquid fuel class. Although fuel oil in general atomizes easily, it does not atomize as easily as gas, and the atmosphere produced by the combustion of oil might possibly contain some unburned fuel in the form of carbon monoxide gas and particles of carbon, along with the products of complete combustion. The hydrogen content of oil is lower than the hydrogen content of the first two gases in Table I. Therefore, only a moderate volume of water vapor will be produced. In general, the atmosphere produced by the combustion of oil will be less decarburizing than the atmospheres produced by the combustion of the gaseous fuels, particularly those having a high hydrogen content.

TABLE II*

Combustion Characteristics of Various Fuels

	Constituents of Gas, Per Cent by Volume				Products of Combustion, Per Volume of Gas			Products of Combustion at Furnace Tempera- tures, Per Cent	
Gas	Hydrocarbons CH ₄ ; C ₂ H ₆ ; C ₂ H ₄	СО	H ₂	Non-combustibles, CO ₂ ; O ₂ ; N ₂	CO ₂	H ₂ O (vapor)	N ₂	CO ₂	H ₂ O (vapor)
Natural	97 to 98 40	6	48	2 to 3	1 to 1.3 0.53	2 to 2.3 1:26	7.5 to 9.3 4.21	10.0	18.4 20.8
Producer	3	27	12	58	0.33	0.18	1.53	16.4	8.9
Producer	0 to 1	25	19	55	0.33	0.20	1.40	17.1	10.4
	Constituents of Fuel, Per Cent by Weight			Products of Combustion, Lb. Per Lb. of Fuel			Products of Combustion at Furnace Tempera- tures, Per Cent		
Fuel	Н		С	Non-Combustibles, N ₂ ; O ₂ ; S; Ash	CO ₂	H ₂ O (vapor)	N ₂	CO2	H ₂ O (vapor)
Bituminous coal Light oil(Pennsylvania)	4 to 5 15		to 81 82	15 to 18	2.8	0.42 1.33	7.8 11.16	17.5 12.5	6.3
Coke		1	86	14	3.2	0.02	7.84	20.6	0.4

^{*} All values in this table are approximate.



Solid Fuels

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> Bituminous coal and coke are the two main fuels in the solid fuel class. Solid fuels are the most difficult to atomize, and the atmospheres produced by their combustion will most likely contain unburned fuel. Bituminous coal contains very little and coke contains virtually no hydrogen. Thus, combustion of either of these fuels produces little, if any, water vapor. Atmospheres produced by combustion of the solid fuels will be the least decarburizing of the three types, and might easily be carburizing because of the presence of carbon monoxide gas and particles of carbon.

> Several other factors that influence the amount and rate of decarburization or carburization in addition to the composition and combustion of the various fuels are as follows: (1) Composition of the material undergoing treatment, (2) the temperature of the treatment, (3) the length of time at that temperature, (4) condition of the surface of the steel undergoing treatment, and (5) the oxidizing (scaling) power of the atmosphere surrounding the steel.

A LOAD of castings from a heat treating furnace. Such furnaces afford close control of surface conditions.

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The first three of these factors can be explained as follows: Increases of temperature, and increases of time at temperature will raise the amount and rate of decarburization or carburization. The ease of carburization varies inversely as the original carbon content of the material and/or the ease of decarburization varies directly as the original carbon content of the material for any given time and temperature.

The other two factors will be considered together as they are closely related. Recent investigations have established several facts concerning the surface of the steel undergoing treatment and the oxidizing power of the atmosphere surrounding the steel.

(1) A coating of scale on any steel at elevated temperatures retards the rate of either decarburization or carburization, and minimizes the ultimate amount of surface carbon change.

- (2) Since an oxidizing atmosphere produces scale, it is advisable to take advantage of this reaction whenever possible in adjusting furnace atmospheres.
- (3) Furnace atmospheres containing from 1 to 4 per cent excess oxygen have been found to produce the best rate and amount of scaling for protection against decarburization or carburization. It has also been found that for temperatures much above 1500 deg. F. the rate of decarburization in oxidizing atmospheres comes dangerously great. Some observers have found that excessively oxidizing atmospheres will produce carburization of high carbon steels (over 0.70 per cent carbon), if only heated for short periods of time. This has been explained by the fact that the oxygen selectively attacks the iron of the steel while the carbides migrate back into the unoxidized steel, forming a ring of excess carbides at



the interface of scale and steel. However, if the steel is held at temperature much more than an hour under these conditions, the reaction quickly reverts to decarburization.

In applying this information about scale and atmosphere oxidizing power to the effects produced by various fuels on steel surfaces, the following points must be considered: (1) Fuels that atomize easily and thus produce products of complete combustion have a tendency to pro-

WHILE heat treating furnaces are in many instances designed for control of atmospheric conditions, often times when the operation is not a finishing operation, such as billet heating furnaces for rolling mills, the installation and operating costs of such furnaces are not warranted.

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duce decarburizing atmospheres due to the presence of only the products of complete combustion (CO₂ and H₂O), which are both decarburizing, and, (2) fuels that are not easily atomized produce some unburned fuel which is carburizing to the steel.

However, an atmosphere composed entirely of carbon dioxide and water vapor, along with nitrogen, has greater oxidizing power than an atmosphere containing some unburned fuel. Thus, the oxidizing power, with the ultimate formation of scale, produced by such an atmosphere will to some extent counteract the decarburizing effect of carbon dioxide and water vapor.

Photometric Determination Methods

PHOTOMETRIC methods for determining columbium and tantalum when present together, with or without titanium, in steel, ferroalloys and slags, were recently described by G. Thanheiser in Mitteilungen aus dem Kaiser-Wilhelm-Institut fur Eisenforschung.

The yellow color of columbium with hydrogen peroxide in a concentrated sulphuric and phosphoric acid mixture is the basis for columbium determination. By mixing these acids properly, the color interference of titanium is suppressed to such a degree that the columbium determination is practically un-

affected by titanium occurrences, and only if more than 1 per cent is present is it necessary to make small corrections. In this acid mixture the extinction of columbium is reduced to two-thirds of the value it would have in concentrated sulphuric acid, but it still remains at a sufficiently high value for accurate determinations to be made.

In determining tantalum presence, the yellow color it produces with pyrogallol in a 3 per cent ammonium oxalate solution is the basis for the process. Since titan-

ium with pyrogallol also produces a yellow color, a simultaneous determination of this element independent of the columbium and tantalum is necessary to make the proper correction. The titanium determination is made with chromotropic acid in the same solution.

The authors also reviewed various known methods of separating columbium and tantalum oxides from steel, ferroalloy, and slag solutions. The results of their check analyses show that the photometric determination methods described are accurate.

Light Alloy Armor Plate

ECENTLY investigations were conducted by C. Panseri, an Italian physicist, on the use of strong light alloy plate as protection against small arms projectiles, and were reported in Light Metals, London. Tests were carried out on the depth of penetration of such projectiles into various thicknesses of Avional D, and aluminum alloy plate, and also with other light metal alloys. In the first series of tests, steel clad, lead filled bullets weighing 0.369 oz. (10.45 gm.), and with a muzzle velocity of 2295 ft. per sec. (700 meters per sec.) were used, these being fired at Avional D, circular plates, 12 in. in diameter, rigidly clamped entirely around the circumference.

The rifle used was the Italian "model 91," the distance of the plate from the muzzle was 5.61 ft., and behind the plate were arranged a number of poplar boards, 3% in. thick and 11 in. in diameter. Trajectory was perpendicular to the plate.

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With a plate 25/32 in. (20 mm.) thick, the projectile went entirely through the plate and penetrated the wood from 0 to 23/64 in. (0 to 9.1 mm.), while the energy remaining after penetration as compared to the initial energy was from 0 to 0.822 per cent. The plate, in other words, absorbed from 99.178 to 100 per cent of the energy of the projectile.

As the plate thickness was decreased, penetration into the wood backing naturally increased. With a 23/32 in. (18 mm.) plate, the projectile penetrated $1\frac{1}{4}$ in. (31.8 mm.) into the wood; with a 19/32 in. (15 mm.) plate, penetration into the wood was $3\frac{1}{8}$ in. (85.7 mm.); and without any plate, the projectile penetrated the wood 3.6 ft. (1.106 meters).

Cross-sectional macrographs through the axis of the bullet hole demonstrated that the plate of fully heat treated Avional D had behaved as a perfectly plastic material, whereas hardened steel armor under similar conditions tended to crack and splinter, exhibiting very little plasticity. It thus appears that the light material not only resists penetration by bodies at high velocity, but also reduces the risk against secondary

dangers of fragmentation, prevalent with steel armor plate. The action of the light alloy plate is comparable to that of a sand bag. Not only the plate, but also the projectile is subjected to some degree of deformation, but ultimately the plate completely embraces the projectile and entirely absorbs its kinetic energy, which is dissipated in mutual deformation.

Hardened steel plate, on the other hand, tends to cause the projectile to rebound. The plate itself does not necessarily become deformed or shattered by the impact, but it does not absorb the energy of the moving body, which may ricochet and still possess enough kinetic energy to constitute a source of danger.

The Italian "type 91" small arm, because of the small diameter of the bullet and its high initial velocity, is particularly adaptable to armor plate piercing. Successful resistance to such penetration requires of armoring a capacity for dissipating considerable kinetic energy per unit cross-sectional area. Actually, had a rifle of a bigger bore been used, it is probable that the penetration resistance of Avional D would have proved even greater.

Further tests were carried out on light alloy armor plating in which hard lead ball ammunition ½ in. in diameter and weighing 0.381 oz. (10.8 gm.) was fired against plates of aluminum alloys in the form of 12 in. disks. The gun used for these tests was a smooth bore type, charges being calculated to give ball speeds of 723, 855 and 921 ft. per sec., these speeds corresponding to energies of 243 ft. lb. (26.67 kgm.m), 327 ft. lb. (37.23 kgm.m), and 380 ft. lb. (43.28 kgm.m), respectively.

Sheets of Avional D, an aluminum-copper-magnesium alloy, Anticorodal B, an aluminum-magnesium-silicon alloy, and Anticorodal C, another aluminum-magnesiumsilicon alloy both 0.118 and 0.157 in. (3 and 4 mm.) thick were used in the experiment. Physical properties of these sheets are shown in Table I.

In these tests, the impact of the projectile produced only shaped depressions, and in no instance penetrated the sheet. The mechanism of such deformation may be viewed as a displacement of metal by inter-crystalline slip, and the resistance to such deformation under impact, therefore, is the greater for materials showing a high capacity for plastic deformation. Thus, Avional D, with an elongation of from 14 to 20 per cent, is more satisfactory than Anticorodal C. the elongation of which is only 2 to 6 per cent, but both materials have about the same tensile strength.

The experiments do indicate that light alloys may be usefully employed for helmets and similar protective devices. Aluminum base alloys, it has been proved at least theoretically, not only maintain considerable plasticity under high velocity impact, but even show increased plasticity under such con-Tests indicate that proditions. tective value of strong aluminum alloy armoring is about equal to that afforded by steel armor of the same weight. The prime cost of the light alloy is higher than that of the steel, but on the other hand, working costs for the light metals are less than for the steel.

The idea of combined armoring is also suggested. That is, a light plate faced with a thin penetration-resistant steel sheet, the purpose of which is to deform the bullet point and reduce the capacity of the projectile to perforate the light alloy backing.

TABLE I

Physical Properties of the Investigated Aluminum Alloys

	Tensile Strength,	Elongation,	Brinell
Material	Lb. Per Sq. In.	Per Cent	Hardness
Avional D	48,400 to 53,600	14 to 20	100 to 115
Anticorodal B	40,800 to 46,000	10 to 14	90 to 100
Anticorodal C	45,600 to 53,400	2 to 6	110 to 120

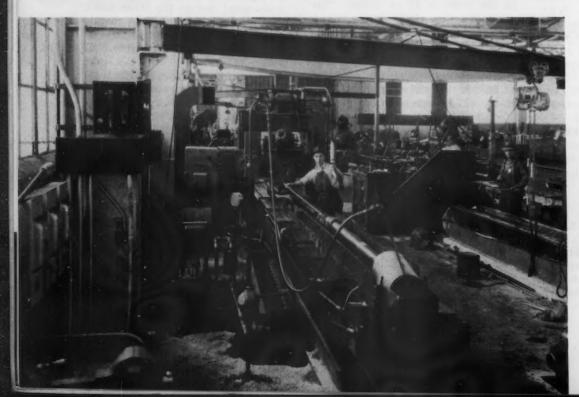
Machining 37- Mm. Gun Barrels



LEFT

CIRST operation on the 37-mm. gun barrels, which are received from the Midvale Co. rough turned and rough bored, is to rough and finish ream the bore in the LeBland gun drilling and reaming machine illustrated. Wood packed, two lipped reamers are employed, using coolant under 300 lb. pressure to carry the chips out of the bore and prevent scratching of the finished surface by chips. Work is held and driven at the breech end with a four-jaw universal chuck and is supported at the muzzle end by a revolving rest. The reamer is guided by a separate bushing. Feed of the tool is by hydraulic power. The finishing cut removes 0.050 in. from the bore, and the tolerance is +0.002, -0.000.

0 0



LOWER LEFT

ACINCINNATI planer has been converted to perform the honing operation on the bore, using a special support for the hone arbor on cross rail of the planer. The Micromatic hone enters the barrel at the breech end and is stroked the full length of 80 in. A mixture of Union base oil and kerosene under high pressure is pumped into the nozzle end and carries the fine chips and grit out through the breech end. A series of baffles in the coolant reservoir allows the solids to settle out before the coolant is re-circulated.

N these and the following pages is shown the complete sequence of operations in the manufacture of 37-mm. rifled barrels for anti-aircraft batteries. The Baldwin Locomotive Works, which set up a special department for the "line production" of these cannon, is to be commended

on their choice of equipment, tooling and methods on two counts especially—use of standard machine tools wherever possible by breaking down operations into simple steps, and the adaptation of existing machinery to perform tasks of a highly special nature. Honing performed on a planer is one such example and gun rifling on a converted lathe is another. The amount of equipment that had to be purchased on the outside was thus kept to a minimum and the time needed to get into production thereby shortened at a time when machine tool deliveries were long.

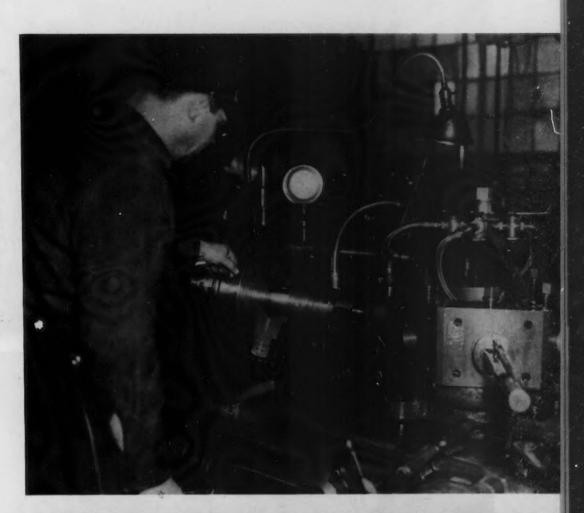
RIGHT

CHAMBERING the breech end for the cartridge is done in a Libby 4H turret lathe with hollow spindle, allowing the barrel to protrude through the rear of the spindle. First two operations are to rough ream, followed by semifinish and finish reaming of both diameters and the cone step. For the last two operations, the tools are two lipped, wood packed bits. All tools are force lubricated internally. Coolant is lard oil and kerosene under 150 lb. pressure.



LOWER RIGHT

RIFLING grooves are cut in this converted Lodge & Shipley lathe with long bed, using the disk or wafer multi-pass method. Altogether, 31 disks, each slightly larger than the preceding one, are successively pushed through the bore. The disks may be seen on the board under the magnifying glass used to inspect the cutting edges. Barrel is clamped firmly during this operation, and the helix angle is generated by the disks as the driving bar is piloted through a helix control bushing shown in front of the operator. At the end of each stroke, the cutters are interchanged. Lubricant again is lard oil and kerosene under 150 lb. pressure.





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TURNING the breech end of the gun barrel on an 18-in. Lodge & Shipley lathe. After the step is cut, a straight portion is turned for 181/2 in. for the recoil slide. In a previous operation in a duplicate lathe, the tapered portion of the barrel is turned by means of a taper turning attachment. Carbide tipped tools are used for both these lathe operations, and a soluble compound is used for the coolant.



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LOWER LEFT

THE recoil portion of the barrel must be ground to a mirror finish and to a tolerance of +0.000, -0.002 in. This view shows the job being done on a Landis grinder. Barrel is supported by six steadyrests with wood bearer blocks. Size control is by dial indicator and micrometer.

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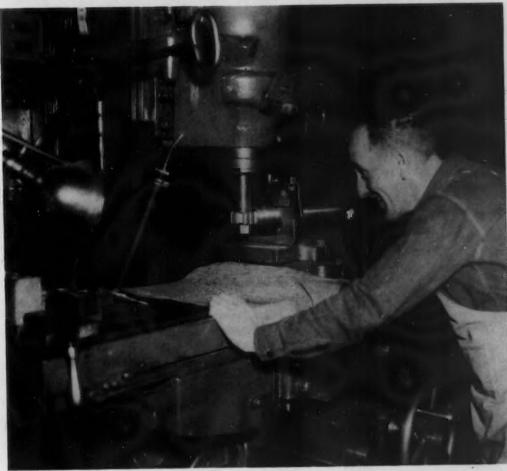
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THREAD on breech end being milled on a Pratt & Whitney thread miller. A modified Acme thread is cut with 29-deg. included angle. The tolerance on the root diameter is held to -0.002 in.

LOWER RIGHT

MILLING cartridge clearance slot in No. 4 vertical Cincinnati miller, using a special fixture to support the work. After this operation is completed, the fixture is swung 271/2 deg. to the side to mill the cartridge ejector slot in the same set-up. Location of the barrel is from a locking slot previously milled in a P & W vertical die sinker adapted for this work. The only remaining operation on the barrel is to mill wrench flats on either side, using an end mill cutter in a Kearney & Trecker model H miller with vertical attachment.





THE IRON AGE, March 19, 1942-45

Cadmium Plating in the

. . . Detailed data on the properties, maintenance and control of cadmium plating solutions, with complementary information on the factors involved in automatic plating.

LECTROPLATING plays a far more important role in national defense than is immediately evident. The most commonly used electroplating process for corrosion protection is cadmium. The reason cadmium is preferred over zinc in most cases, and tin in some cases, is due to one or more of the following facts: Cadmium plated parts are more easily soldered than articles coated with zinc. The ease of soldering compares favorably with tin plated parts. Cadmium is chosen for electrical contacts because it has a lower electrical resistance than that of zinc. Government specifications demand cadmium plated parts more frequently than zinc or tin plated parts. Also, in these specifications the cadmium thickness demanded is from three to five times thinner than that demanded of zinc. this, add the fact that cadmium deposits much more quickly than zinc or tin, that the cadmium bath is more easily operated than the zinc bath, and that cadmium protects steel from outdoor corrosion much better than tin, and the reasons for preferring cadmium to zinc and tin become evident. Another advantage of cadmium deposits is their high ductility. Parts to be formed or stamped may be plated prior to these operations as the ductility of the deposits permits the cadmium to spread over the areas of bending.

Cadmium protects iron because the coating is non-porous and because cadmium is anodic to iron. Since the coating is non-porous, it excludes corrosive media from the iron surface and hence prevents corrosion. The fact that cadmium reacts as if it were above iron in the electromotive series causes the former to dissolve in preference to the latter at surfaces where both the metals are in contact. Since zinc is more electronegative than cadmium zinc will protect iron over a greater range than cadmium. However, this same property of zinc will cause it to dissolve more rapidly, leaving the iron bare and subject to direct attack. The relative positions of certain metals in the galvanic series are shown in the following table. Each metal is more active than the one below it and will therefore protect it. This series' is built upon actual experience with corrosion and laboratory measurement. Metals grouped together have no strong tendency to

Robert J. McKay and Robert Worthington, "Corrosion Resistance of Metals and Alloys," pp. 33, 180-199.

produce galvanic corrosion on each other; connecting two metals distant on the list from each other tends to corrode the one higher in the list. Voltage figures are not given because these vary with every new corrosive condition. Relative positions of metals change in many cases but it is unusual for changes to occur across the spaces left blank.

Magnesium Aluminum Duraluminum

Zinc Cadmium

Iron Chromium iron (active) Chromium nickel iron (active)

Soft solder Tin Lead Nickel Brasses Bronzes Nickel copper alloys

Chromium-iron (passive) Chromium-nickel-iron (passive)

Silver solder

Silver Gold Platinum

It will be noted that cadmium is placed immediately above iron in the series. This is not so in the "Electromotive Series" as shown in most text books. However, from its position in the periodic table and from its electrochemical behavior, it is believed that cadmium would be correctly placed above That it does protect iron against corrosion has been shown by Blasset' and numerable others, and also by tests made by the U.S. Navy.4 The closeness of iron and cadmium in the electromotive series is also an aid in protecting cadmium plated steel parts since any corrosion cell that may be formed could only be driven by a small electrical force.

² W. Blum and G. B. Hogaboom, "Electroplating and Electroforming," p. 124.

³ Metal Industry Journal, Vol. 9, pp.

509, 1911.

A. Mankowich, "Corrosion Resistance of Cadmium and Zinc Electrodeposits Under Marine Conditions," Monthly Review American Electroplaters' Society, Nov., 1940, pp. 833-839.

C. W. Culpepper and H. H. Moon,

⁶C. W. Culpepper and H. H. Moon, "Significance of Corrosion of Iron and Tin when Immersed in the Expressed Juices of Fruits and Vegetables," Canner Journal, 68, April 20, 1929, pp. 17-21.

Tin stands below iron in the ordinary electromotive series and also in the galvanic series presented above. It is well recognized, however, that the electrochemical behavior of metals in couple under certain conditions is controlled by factors that do not necessarily exist in the test conditions under which these series are built. Although tin

neVictory Program

By ANTHONY J. FUSCO and

NORMAN E. WOLDMAN

Assistant Chief Chemist and Chief Metallurgical Engineer Respectively, Eclipse Aviation Division, Bendix Aviation Corp.

is placed below iron, there are many cases under which tin is anodic to iron.1, 5. This is due to the high overvoltage of hydrogen on tin. A notable example of anodic tin in tin -iron couples is the tin can. The value of the tin can is very greatly increased because of the sacrificial corrosion of tin in preference to

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In the past, there has been much controversy over the relative protection offered by zinc and cadmium coatings, with the consensus of opinion that zinc gives the superior protection. However, data^s obtained by the U.S. Air Service indicates that a cadmium coating is equal in protective value to one of zinc that is three times as thick. Cadmium is far more resistant to alkali than zinc and this leads to its being used to protect certain die When subcastings from alkali. jected to corrosive media, cadmium holds its brightness longer than zinc and tarnishes at about the same rate as nickel.

Maintenance of Plating Solutions

The throwing power of a cyanide cadmium plating bath is unusually good. The alkali tin bath is the only plating bath possessing superior throwing power. This ability to deposit cadmium in recesses insures fairly uniform coatings on the intricate parts used in defense which require protection from corrosion.

The rate of depositing cadmium is fast partly because it is deposited at fairly high current densities and with high cathode efficiency and partly because of its high atomic weight. Calculated on the basis of 100 per cent cathode efficiency 2.1 gm. of cadmium are deposited per amp.-hr. as compared with 1.2 gm. of zinc per amp.-hr. and with 1.1 gm. of tin per amp.-hr.

In these days of speeded-up production for defense, the rate of deposition becomes an important factor.

Although cadmium plating baths are easily operated and maintained for production purposes a close control of solution composition, operation and thickness of deposition is essential for production of high quality, corrosion protective coatings. This is not a disadvantage, since the range of concentration of the ingredients of the bath and operating conditions for proper control is larger than for most plating baths. The concentrations of the constituents of the cyanide cadmium bath in common usage are as follows .6

as lunuws.			
	Still, Oz. Per Gal.	Barrel, Oz. Per Gal.	
Cadmium metal	3.0-4.5	2.3-3.8	
Equivalent to cadmium			
oxide (CdO)	3.4-5.1	2.6-4.3	
Total sodium cyanide		9.0-14.5	
Caustic soda	add none	add none	
Caustic soda equiva- lent to cadmium			
oxide	2.1-3.2	1.6-2.7	
Ratio total sodium cyanide/cadmium.	3.8	3.8	
Bright current density range with addi-			
tion agents	15-45 amp.	5-25 amp.	
	per sq. ft.	per sq. ft.	
Volts	1-4	7-14	
Temperature, deg. F. Anodes for high cur-	80-95	80-95	
rent density	Cadmium bar		
Anodes for low cur-			
rent density			
Tanks	Rubber lin	ed or steel	

A great many brighteners have been suggested for cadmium plating, a good many of which have been patented. Some of these brighteners are organic, some inorganic and some are a combination of both. The addition agents which have proven to be most successful have been patented. However, there are other addition agents which do improve the brightness of the de-These brighteners include posit. small amounts of nickel, glue,

R. O. Hull, "Cadmium Plating," Plating and Finishing Guidebook, pp. 33-35, 1941.

casein, gulac or sulfonated castor oil. Tests have been made in the past on the relative protective value of bright deposits versus dull deposits and in all cases the bright deposits gave superior corrosion protection to steel than the dull de-

The most important single factor regarding the concentration of sodium cyanide and cadmium oxide is the ratio between the two. For lower current density operation the lower concentrations of cadmium should be used, and for higher current density operation higher concentrations should be used. Cadmium plating baths have been very successfully operated at a concentration of metal as low as 2 oz. per

The Udylite process for plating cadmium has been very successful, and the recommended metallic cadmium content is 2.0-2.5 oz. per gal. However, the concentration of sodium cyanide is also relatively In the Udylite process the brightener and sodium cyanide are mixed homogeneously and in such proportions that the proper concentration of brightener will be present when proper additions of sodium cyanide are made.

The Cadalyte process, also, takes advantage of controlling the concentration of brightener by additions of sodium cyanide. The mix-

CORTY-SIXTH in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

ture of sodium cyanide with addition agents is called the "Cadalyte Maintenance Compound." For making up a new bath the "Cadalyte" salts, which contain cadmium as well as all the other necessary compounds, are dissolved in water and the bath is ready for use. The deposits obtained from these baths are said to be bright and lustrous. Both the Cadalyte and Udylite processes have helped the plater to easily control the concentration of

brightener in the cadmium plating baths. Both companies supply test sets for analysis of cadmium and cyanide content of the cadmium plating bath.

Frequent analysis should be made of cadmium plating baths. The concentration of some constituents of the bath is more important than the concentration of others. Analysis for sodium cyanide content and additions of the salt should be made at least twice a week and an ac-

curate record should be kept of these analyses and additions. From these records it may be possible after a time to apportion certain amounts of cyanide to be added each day. Even after a standard daily addition is decided upon a complete analysis should be made at least once a week. Low cyanide content results in low anode efficiency and finally in depletion of metal in the bath. Improper cyanide content may also aid in the

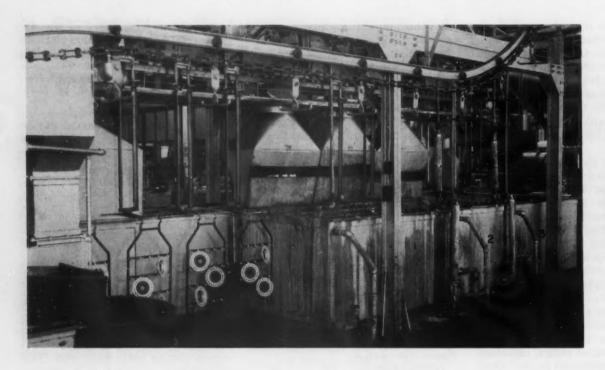


FIG. 1— From the degreasing operation, parts are brought to the loading platform shown here to the left of tank No. 1.



FIG. 2—
Other tanks in the automatic plating set-up. Tanks Nos. 3 and 4 are water rinse tanks, and tank No. 5 contains muriatic acid.

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formation of sodium carbonate. Carbonate in excess of eight oz. per gal. leads to a narrowing of bright current density range of plating. In cases where cadmium plating solutions are not analyzed for long periods of time it is very possible that the bath will become inoperable due to working at improper concentrations.

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tains acid. The carbonate content should range within 2 to 6 oz. per gal., preferably at the lower level. Since

the accumulation of carbonate in a well controlled bath is slow, an analysis for carbonate concentration made every three or four months is usually considered adequate. Carbonate may be removed from the bath by precipitating calcium carbonate with a special gypsum prepared for that purpose. Although it is rather cumbersome, the best method for removing carbonate in cold weather is by "freezing out." This is accomplished by

ailowing the bath to cool outdoors to a temperature of approximately 25 deg. F. By this method no foreign ions are introduced into the bath.

Since the ratio between cadmium content and cyanide content is so very important, a check on metal content should be made weekly.

Although caustic soda is an important constituent of the bath, it is not usually added, since any ad-

FIG. 3—Tank No. 7 contains a cyanide solution dip, and tank No. 8 is the cyanide rinse tank.

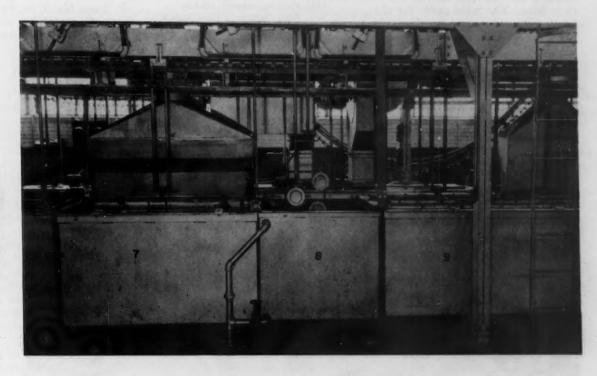


FIG. 4—This is the 2100-gal. plating tank. The anodes are of the basket and ball types.



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ditions of cadmium oxide produce caustic soda in the bath.

Cadmium plating in a barrel tends to heat the solution above the recommended temperatures for bright plating. If all other conditions as specified are present, the deposits formed will be dull, unless some means are taken to cool the solution. High temperatures also lead to rapid formation of sodium carbonate and requires frequent analysis and removal of the excess carbonate. The main cause for the heating up of barrel solutions is the large amounts of current which

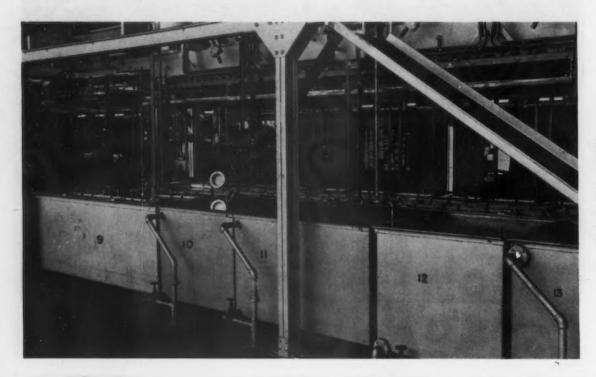
ning of the cycle and to remove the work at the end of the cycle.

The sequence of operations is outlined below and the description follows:

- (1) Degrease (trichlorethylene)
- (2) Rack work to be plated
- (3) Load conveyor
- (4) Cathodic alkaline cleaner
- (5) Rinse
- (6) Muriatic acid dip
- 7) Rinse
- (8) Cyanide dip
- (9) Rinse
- (10) Plate in cadmium solution
- (11) Rinse thoroughly (cold water)
- (12) Rinse (hot water)
- (13) Dry (air dry-compressed air)

alkaline direct current cleaning tanks. The time allowed for the work to be immersed in the alkaline cleaners permits only the cleaning of work which does not contain too much grease or oils. The reason for the two smaller cleaning tanks instead of one large one is so that the more concentrated grease and dirt will be removed and deposited in the first tank, thus allowing the second tank to be kept relatively clean.

Tank No. 3, shown in Fig. 1 and Fig. 2, and tank No. 4, shown in Fig. 2, are both water rinse tanks.



Tanks No.
12 and No.
13, shown
here, can be
used as bright
dips for the
cadium plate.

is forced to flow through the solutions. It is therefore advisable to equip the tanks containing the solutions with cooling coils, and temperature readings should be taken frequently to insure uniformly bright deposits.

Automatic Cadmium Plating

The Eclipse Aviation division of Bendix Corp. makes use of full automatic equipment for the plating of cadmium. The crew required to operate the automatic equipment consists of seven or eight men, depending on the ease of racking and unracking the work. One member of the crew is in charge and his main duties are to control the speed of movement of the work to be plated and to adjust the current and voltage to their proper values. The duties of his assistants are to rack the work to be plated at the begin-

The degreasing operation is carried out in a separate unit from the automatic equipment. The type of degreasing is both liquid and vapor. Since the vapors are free from grease or nearly so, most of the impurities that may have been picked up in the liquid immersion are rinsed off by the condensed vapors. From the degreasing operation, the parts are placed on racks and brought to the loading platform which is shown in Fig. 1, left of tank No. 1. In the racking operation, the pieces must be hung in such a way that there is a minimum drag out from tank to tank. Also the parts to be plated must not touch each other since at such points of contact there is likely to be only thin deposits formed owing to the shadowing of one piece by

Tanks No. 1 and No. 2 are the

The reason for having these two tanks instead of one large tank is similar to that stated above regarding the two alkaline cleaners. The thorough removal of the alkaline cleaning solution is important since any alkali carried through would neutralize the acid dip solution to follow and thus shorten the life of the acid bath.

Fig. 2 also shows tank No. 5, which contains a solution of 1:1 muriatic acid. This dip will remove any slight rusting or scale. Any heavy scale or heavy rusting must be removed before the beginning of the cycle. The acid dip tank is also equipped with blowers which remove the hydrogen gas evolved from solution. The acid dip is followed by a water rinse in tank No. 6.

Tank No. 7 is shown in Figs. 2 and 3. This is a cyanide solution

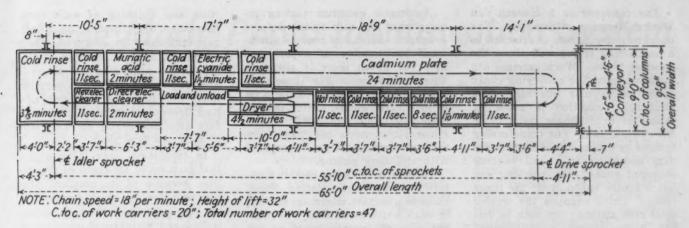


Fig. 6—Top view of the automatic cadmium plating apparatus.

dip which contains approximately 8 oz. per gal. of sodium cyanide. Any remaining acid which might be retained by the work after coming from the acid rinse water would be neutralized in this bath with the accompanying evolution of poisonous hydrogen cyanide. It is therefore necessary to have a blower above the tank to remove these poisonous fumes. The cyanide dip also helps to remove any last traces of oil that may still adhere to the work. Since sodium cyanide is a major constituent of the plating bath, the cyanide dip is placed just prior to the cadmium plating bath. Tank No. 8 is the cyanide rinse tank.

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Fig. 4 shows the 2100-gal. plating tank (No. 9). The anodes in the bath are of the basket and ball type. As the balls of cadmium are dissolved in the solution new cadmium balls may be added from the top and hence the anode area may be kept fairly constant. Another important advantage of the ball and basket type anode is that there is little or no waste as each individual ball remains in the bath until it is completely dissolved.

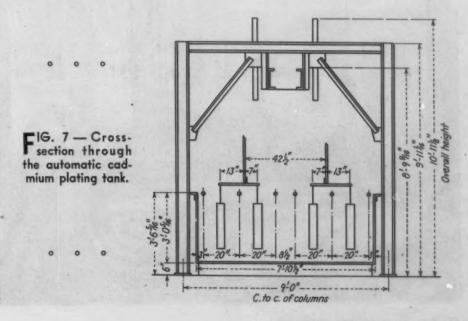
One peculiarity of automatic cadmium plating which does not exist in still tank plating is the variation in current density that may occur when starting and finishing a load of work. As the first rack of work is immersed in the plating solution the cathode area present is only a small fraction of what it will be when the full load is immersed. Hence the desired current for the full load should be produced only after the first rack has reached the end of the plating tank. Therefore the current is increased gradually at the beginning of the cycle and decreased gradually at the end of

the cycle. A typical analysis of the cadmium plating bath would show from 2.0 to 2.5 oz. per gal. of cadmium as metal and 5.0 to 6.0 oz. per gal. of sodium cyanide as free Incorporated with the cyanide is a brightening agent supplied by the Udylite Corp. Analysis of the bath for concentration of the brightener is not necessary since the amount of brightener varies somewhat as the concentration of the sodium cyanide. Since the installation of the automatic cadmium bath no analysis for concentration of brightener has been found necessary as the deposits have been consistently bright.

There are six rinse tanks following the cadmium plating tank, four of which are shown in Fig. 5. Tanks No. 12 and No. 13 can be used as bright dips for the cadmium plate; however, the bright dip has not been found necessary in

the Eclipse process. The final two rinses are hot water to aid in drying the work.

A sketch of the top view of the automatic cadmium plating apparatus, Fig. 6, and a cross-section of the end view of the cadmium plating, Fig. 7, tank are shown. The successive steps of the plating process may be followed by starting at "load" and proceeding to the left. The number of minutes that each piece of work remains immersed in each bath and the type of bath is shown at each tank. The speed of the chain may be varied so the time in minutes recorded is based on a chain speed of 18 in. per min. In transferring the work from one tank to another, the lift arms raise the work carriers to a height of 32 in. above the tanks to allow ample space for the work and rack to be transferred without touching the tops of the tanks.



The conveyor is a Hanson-Van Winkel-Munning return type. The operating mechanism is attached to a supporting frame well above the solution tanks. Work carriers are mounted upon the conveying chain spaced at regular intervals. The electrical connection is made by means of drum finger contacts on the cathode rail. The transferring is done by means of a steel transfer arm operating in a ball bearing equipped guide. The working end has a double ended stud; the inner end of which engages the welded steel cam, causing the arm to follow a continuous predetermined path. The outer end of the stud serves to pick up the work carriers in succession and carry them through the transfer operations.

Automatic cadmium plating accomplishes two aids to the defense program. First, the process diminishes the number of experienced help (of which there is always a shortage in times like these) because only one member of the crew is in control of the entire plating cycle. Secondly, the output of cadmium plated parts per man is increased tremendously as compared with still tank plating.

There are, however, certain limitations to automatic plating. First, there is a certain minimum amount of work which must always be present since the process must be run continuously, otherwise the maximum efficiency of the process will not be attained since there is a fall-off in production at the begin-

ning and finishing of each cycle. Secondly, when plating to a certain thickness is required, there should be a great number of one type pieces, otherwise new values of amperage and speed of operation must be calculated for each new load depending mainly on the surface area and partly on the shape of each new type piece.

In conclusion, may it be stated that because of its speed of deposition, because of its excellent protective value on steel, because of the ease with which the bath is controlled and maintained, continuous cadmium plating is ideal for coating certain metals during these periods when time and experienced help are at such a high premium.

Heat Treating Tubular Airplane Parts

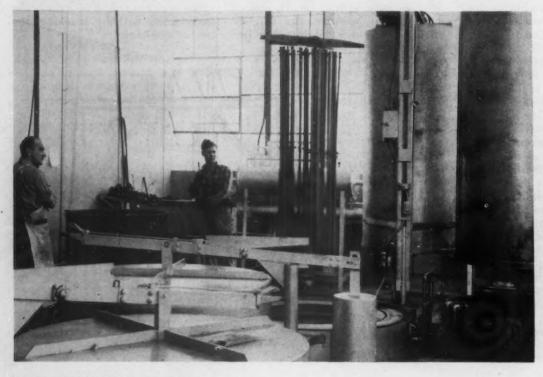
TUBULAR parts for Lockheed interceptor planes are now being produced in record time at the Menasco Mfg. Co., Los Angeles. Since these vital parts must be both elastic and tough to withstand the strain of the movements of these fast airplanes, careful heat-treating is essential.

To accomplish this job in step with today's high-geared production, Menasco has installed four General Electric cylindrical electric furnaces for hardening and drawing, and a water-cooled oil quench. Two G-E atmosphere gas converters maintain an inert atmosphere in the furnaces, and assure that the analysis of gas in the furnaces is constant regardless of changes in the rate of flow.

Heretofore, one of the greatest difficulties in hardening and drawing tubular parts has been excessive cooling encountered in transferring the parts from the furnace to the quench tank. This difficulty has been overcome by installing two quenching hoods on the hardening furnaces to protect the parts as they are transferred.

This transfer of parts is accom-

plished quite simply. After the charge is brought up to the proper temperature in the hardening furnace, a high-speed hoist, equipped with a transfer hood, is brought over the furnace and the charge quickly pulled into the transfer hood. The hood is then positioned over the quench tank and the charge dropped into the oil. This transfer hood minimizes cooling, warpage, and scaling of the thinwall tubular parts during transfer from the furnace to the oil quench tank.



the plant Menasco Mfg. Co., Los Angeles this G-E vertica vertical electrical furnace set-up is used heat treating tubular-shaped parts. The equipment consists of hardening and drawing furnaces, an oil quench, two jib hoists with transfer hoods, and protective atmosphere equipment. The furnaces have a 30-in. inside diameter and can accommodate parts 50 in. long.

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Home Made Photo Identification System

7 HEN faced with the necesof photographically identifying all employees in their plant working on government wartime contracts, the Columbia Steel Tank Co., St. Louis, felt that, because the expense involved in hiring an outside photographer to do the job was too great, a unit could be built in the plant and a professional job done economically without outside help. Furthermore, in having an outside photographer do the work, there would be considerable productive time lost, since the photographs would have to be taken during working hours.

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hinsfer nch An inexpensive shop-made unit that would do professional work at a fraction of the cost of any other method was developed. It consists essentially of an ordinary Brownie Reflex camera and two R-22 photo flood with necessary stands, costing less than \$30.00. A special cabinet was built for the unit when not in use. Fig. 1 shows the front hinged portion of the cabinet down, with the framing device, identification numbers, and flood lamps in

place for operation. The cabinet is made of steel, but plywood construction is equally adaptable. Cabinet dimensions are 36 in. high x 24 in. wide x 14 in. deep. The hinged cabinet front is 4 in. deep. The platform on the inside is extended from the hinged edge forward 121/2 in., and the camera bracket mounted on the platform measures 4x4x10 in. The base tapers to the top, holes for horizontal adjustment are on 21/2 in. centers, and the centered slot in the bracket permits vertical adjustment.

Tests revealed that the exact position of the camera should be with the lens $8\frac{1}{8}$ in. forward from the platform hinge. The camera was mounted upside down with the lens position, determined by the base (top in inverted position), being 715/16 in. from the platform. The removable frame on the front edge is $23x17\frac{1}{4}$ in., with a $1\frac{1}{2}$ in. offset at the slotted mounting. The frame was made of $\frac{3}{8}$ in, rod. The base of the cabinet is 40 in. from the floor.

In operation, an adjustable stool permits centering the employee in the frame so that employee's chest rests against the edge of the platform. The identification numbers are removable and easily changed. A negative mask permits 2½x2 in. prints to be made, as shown in Fig. 2. A special die for die cutting the photos as shown in the center illustration cost \$7.00, and the shield was designed with a pin back so the employee could wear it on any clothing. As the film cost is 32c. a roll and the print cost is 4c. each, the cost of each finished print is less than 7c., and the negative is retained in a master file or with individual employment records.

With the equipment described, from 60 to 75 photographs per hr. can be made, taking into consideration the time required for reloading the camera after every 12 shots. At Columbia Steel Tank Co., employees, by department, were taken for 30 min. each day immediately after working hours or during shift changes. This met with no objection either from the employees or the union.

As a matter of information, since the camera has an F-11 lens, it was necessary to use Eastman Super XX film. The exposure was set on "instantaneous," which is about the equivalent of 1/30 sec. on more expensive cameras. A portrait attachment for the camera may be obtained if better photos are desired.



ABOVE

FIG. 2—The 2½ x 2 in. photo on the left is die stamped into a circular form, as shown in the center, and fitted into a pin-shield bearing the company's name, as shown at right. This shield can be stamped with department number, as well as the company name to facilitate identification.

RIGHT

FIG. 1—When the cabinet is opened up, the lid forms the base for the camera, framing bracket, and establishes the distance between the employee and the camera. This unit, without the lamp holders, costs less than \$30 to build.



THE IRON AGE, March 19, 1942-53

Artillery Cartridge Cases

HE question of using steel for cartridge cases has been raised many times, and as long ago as the days of World War I the German army used steel cartridge cases. These cases were of the short, slightly tapered type used in guns of fairly large caliber and the evidence available was, that while the guns fired satisfactorily. the cases could not be extracted from the weapons except by ramming. This point is evidenced by the fact that ammunition boxes picked up on the fields of battle showed that such ammunition could not be used in barrage fire. In other words, rapid function of the guns could not be expected with such ammunition.

Through the years since those days, the question has been raised repeatedly, and from time to time cartridge cases made of steel have been considered.

It has always been the firm belief in America that the country's resources provided an entirely adequate supply of copper and zinc for any requirements which might have to be faced, even if another war should come. Therefore, since the brass cartridge cases being used by the American services were so eminently satisfactory in every respect, there was comparatively little urge to undertake the tedious and difficult development of adequate cartridge cases from steel. However, such data as were available were carefully accumulated to be in hand if the need should arise.

Early in the defense effort there first appeared a stringency in zinc and, with such a condition, more active consideration was given to the problem of making cartridge cases from steel. The initial efforts

were predicated on the opinion that because of the depth of draw necessary to make cases, some difficulty might be expected in manufacturing cases strictly along the lines of the brass case. Therefore, the early efforts were directed in the line of cases made of several pieces. It was known that such methods had been tried in foreign countries. It was known that some success had been obtained in making cases which were partly steel and partly brass. Almost without exception such fabricated cases developed weaknesses not present in the standard type of brass case. One of two or sometimes both of the following types of failure occurred: either the case burst in the region near the extractor rings, or it expanded and seized in the gun. Either type of failure meant that rapid-fire weapons could not be served with such ammunition. Therefore, it became evident that that line of attack was not too hopeful of successful conclusion. It was further recognized that in all likelihood such composite structures would cost more than a singlepiece structure, provided practicable methods for the production of the latter could be developed.

With all of the foregoing in mind an approach was made to the problem of using deep drawing steels of the types used by the automotive industry to make cartridge cases. Here again the results were not successful since such steels had inadequate physical characteristics and the cases seized in the guns. However, it was established that cases meeting the requirements of form and size could be produced. The problem then resolved itself into a question of metallurgical research to arrive at steels which when drawn to the shapes required had physical characteristics adequate to answer all of the needs of a cartridge case.

To clarify these needs, the fol-

lowing statement of the requirements of a cartridge case is set down:

- (1) It is a container for the propellant powder which when ignited causes the projectile to pass through the gun tube to continue its flight to its target.
- (2) It is very frequently a supporting structure for the projectile so that both projectile and case in combination become a complete round of ammunition.
- (3) The case is a support for the primer which is the element that causes the ignition within the propellant powder. The case acts, on firing, as a valve so that the pressures created by the burning of the propellant are sealed in the gun. In other words, the case must obturate at the mouth to prevent the passage of any gas or powder particles into the region between the case and gun chamber.

Obviously, the case at the time it is inserted into the gun chamber must have clearance. In other words, its diameter must in all cases be smaller than the diameter of the gun so that the case may enter freely. When the gun is fired, the pressures generated within the case are such as to cause the case to expand until there is intimate contact throughout its length with the gun chamber. The gun itself being a fully elastic structure moves outward as a result of the pressures, and at the completion of the phenomenon of firing returns to its original diameter. At this time, the case must extract freely and therefore the case must not only have returned to a diameter equal to the inside of the gun chamber, but must return still further so that clearance again exists between the case and the chamber. To accomplish this latter requirement was the greatest problem to be solved.

Independent studies made at a number of different places brought

es Made From Steel

By H. R. TURNER
Lt. Col., U. S. Army Ordnance

out certain fundamental facts and mean values of yield strength were established below which the failure of a case to extract freely could be predicted. This phase of the problem has been solved. Extensive work has shown that by using a steel of comparatively simple chemical analysis, cold worked with careful annealing operations throughout the process, steel cases can be produced which adequately perform all of the functions indicated above. At the present time, additional contracts involving small quantities of cartridge cases are in the process of completion for all of the active calibers in use in the Army.

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One very real problem still exists. The corrosion characteristics of steel are well known. To obtain coatings which are rust-proof over a long period of time, will no doubt be a difficult problem to solve. Now that the country is in a "shooting war," and all ammunition being manufactured may reasonably be expected to be expended rather promptly, the corrosion problem will first be solved on a short-time basis with the long-time treatment to be considered as time, equipment and personnel are available for the task.

It is definitely out of the question to use paints, lacquers or other coatings of this type since the peculiar conditions to which ammunition is subjected make failure to function almost assured when such coatings are used. Therefore, the answer lies in plating. Whether the final solution will be copper plate or zinc plate of the more or less conventional types, or some combination of these, or some new finish that may come forth in the active investigation under way, is still to be determined.

Obviously, platings must be confined to metals which are not strategic nor seriously critical. In other words, nickel and chromium are not available for the task. Fairly good results, however, have



been realized with both copper and zinc finishes and for the short-time program, the situation is well in hand.

It is not necessary nor desirable to attempt to go into any detail as to the methods, materials or technique which have been developed in the solution of this problem. Suf-

fice it to say that in the past few months because of the most excellent cooperation of the industries of our country most familiar with the art of drawing steel, very gratifying results have been realized in the solution of this problem, and that its successful conclusion is immediately before us.

Magnafluxing

It is extremely difficult to obtain accurately graduated test specimens for making comparative studies of sub-surface defects with magnaflux. The behavior of sub-surface defects in causing the leakage fields, upon which the magnaflux method is dependent for its success, varies over wide limits. Some of the factors causing these variations are the permeability of the steel and

the shape, size and location of the defect, all with relation to the area and shape of the section in which they occur.

Probably the most satisfactory method of accumulating comparative test data on sub-surface defects is to prepare specimens simulating such defects artificially. One method of doing this is to drill holes in pieces of the desired shape and size at varying depths

from the surface. In general the reluctance of such artificial gaps is greater than those caused by natural defects.

Illustrated in Fig. 6 is a ring in which holes were drilled as shown in the lower right hand figure marked end view. It will be seen that the distance of these holes from the surface increases progressively from top to bottom. Patterns obtained with 60 cycle a.c.,

d.c. and full wave rectified a.c. are illustrated in columns 1, 2 and 3, respectively. Here it can be seen that with the exception of the first hole, which is nearest the surface, these sub - surface defects are not well shown by a.c.

It is well known that a.c. has a distinct skin effect, and the higher its frequency, the less the penetration

Col. 1 Col. 3 Full Wave Rectified AC 500 Amp. 500 Amp. 1000 Amp. 1000 Amp. 2000 Amp. 2000 Amp. 3000 Amp. 3000 Amp. 1000 Amp. 2000 Amp. 3000 Amp. End View (Depth)

FIG. 6—Indications of sub-surface defects in a ring as obtained by various testing procedures.

ng Procedures

of the magnetic field so generated. The a.c. magnetic field is very intense at the surface, and it is for this reason that, given the current flow indicated by the meter reading, a.c. is superior to d.c. for surface defects and inferior for subsurface defects in cases where the deepest possible penetration is required. It is also seen that full wave rectified current is more effective than straight d.c. where

deep penetration is required. This is probably due to the slight ripple of the rectified d.c.

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Wet vs. Dry Method

Comparative results obtained with the drilled specimen previously described (Fig. 6) using the wet continuous method as against the dry powder method are shown in Fig. 7. The same amounts of

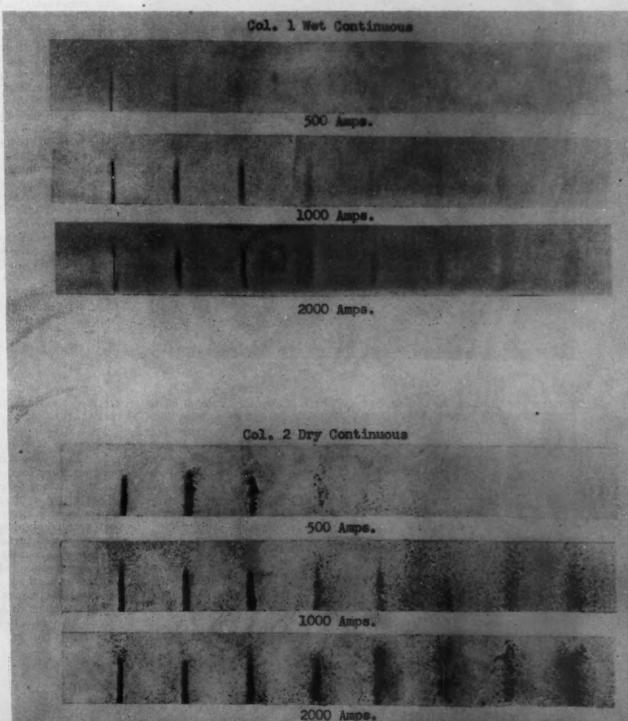
FIG. 7—A comparison of wet and dry methods of testing for subsurface defects.

. . . The authors herein conclude their report of an original study of the influence of various testing procedures on the quality of indications obtained from surface and sub-surface defects. The first part of this article, dealing largely with surface flaws, appeared last week.

direct current were used for magnetizing in each case. It will be seen that the patterns obtained in column 2, which were those given by the dry powder, are much more sensitive than those obtained by

the wet continuous method shown in column 1.

It should be noted that the dry continuous method, that is, dusting powder on the part while the current is flowing, was used in ob-



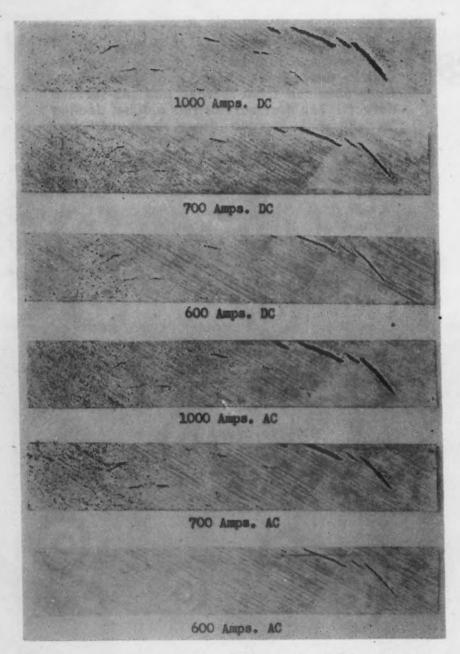


FIG. 8—A comparison of a.c. and d.c. patterns of flakes in a section of a billet.

taining the patterns in column 2. The implication of these results is that for sub-surface defects, where maximum penetration and sensitivity is desirable, the dry method is preferable to the wet method.

The optimum particle size and coercive force of the finely divided ferromagnetic material for the best results in locating sub-surface defects is different from that for locating surface defects. For best results, one type of inspection medium should be used for locating surface defects and a different one for locating sub-surface defects.

There is also an optimum particle size for defects of a given magnitude. In general, large powder particles should be used for maximum pattern build-up on large defects; on small defects, small powder particles. This means that specially prepared powders can be expected to give the best results, a fact borne out in practice.

An interesting comparison between a.c. and d.c. is shown in Fig. 8. This illustrates magnaflux patterns obtained due to flakes in a section of a forged billet. Using a.c. it is seen that some of the indications, in comparison with the indications obtained by using d.c.,

are faint or entirely missing. Other indications, however, are just as good as with d.c. This is explained by the fact that some of the flakes are sub-surface and some at the surface. Using a.c. tends to show up the surface indications as good or better than d.c., while for sub-surface flakes the d.c. is more sensitive.

Summary

The results of this investigation of magnafluxing procedures can be summed up as follows:

- (1) A series of tests were made to determine the effect of the duration of current flow on pattern build-up. The results of these tests show that with a concentration of ferromagnetic particles in the range of 1½ oz. of standard paste to 1 gal. of suspensoid, that a period of 0.5 sec. of current flow is sufficient to permit an entirely satisfactory build-up. There is some increase in pattern build-up when the time is prolonged to 2 to 3 sec.
- (2) Patterns obtained by a.c., d.c. and rectified a.c. on surface defects were compared using the wet continuous method. It was found that such indications are much more clearly brought out by a.c. than by d.c. with the same meter readings. It was also found that full wave rectified a.c. gives results comparable to d.c. obtained from storage batteries, and is also inferior to 60 cycle a.c. for surface defects.
- (3) Patterns obtained from surface defects employing the wet continuous method, using a.c. and d.c., were compared. It was found that sub-surface defects, with the exception of those quite near the surface, are not well shown by a.c. as compared with d.c. Full wave rectified a.c. was slightly more effective than straight d.c. where defects are deep lying and deep penetration is required.
- (4) The wet and dry continuous methods were compared for locating sub-surface defects in a series of tests using identical amounts of d.c. in each case. It was found that results obtained by the dry powder on sub-surface defects are much more accurate and sensitive than those obtained by the wet continuous method.

These conclusions are based on a large number of test specimens from which selections were made for this article.

Bombs From Seamless Tube

THE aerial bomb is not subject to the severe forces imposed on a shell, and for that reason production techniques are frequently relatively simple, often being variations of peace-time practices.

Seamless tubing is well suited for most sizes of aerial bombs, ranging from the 17-lb. fragmentation bombs often carried on the underside of aircraft wings to the very heavy types of demolition bombs. For the larger sizes, tubing lengths are handled and formed in much the same equipment and manner as are acetylene and oxygen tanks.

The photographs on this page illustrate three stages in the manufacture of aerial bomb casings of an undisclosed size and type at one of the plants of the United States Steel Corp.

At the top, a hydraulic press operator is shown "tailing" a casing. The casing, originally a length of seamless steel tubing, has been heated in the furnace behind the operator and is mounted on a fixture which permits it to be rotated for the "tailing" operation. This operation may be contrasted with the "nosing" of artillery shell, where absolute concentricity is essential and where the entire shell is placed vertically in the press.

The photograph in the center illustrates a stage in the machining of the casing in a special automatic boring machine equipped with a work-holding in dexing fixture. Work handling is facilitated by the conveniently located conveyor shown in the foreground.

In the lower illustration, welders are applying to the casings the lugs which will simplify handling of the loaded bomb and provide a means of suspension in the racks of a bomber.







THE IRON AGE, March 19, 1942-59

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New Equipment . . .

Small Tools and Gages

Many new small tools, gages, tool accessories, and other useful items around a shop or plant are described in this week's section on new equipment.

Heavy Duty Electric Drill

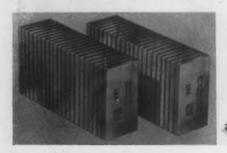
A POWERFUL ¼-in. hand drill, built by Black & Decker, is designed especially for heavy produc-



tion requirements of airplane, aircraft accessory, and similar construction operations. The new Holgun unit is built in four models: standard and low speeds in end and side handle units. The drill weighs only 1 lb., is 73/4 in. long, and has a pistol grip and trigger control. Tools are powered by universal motors and are ball bearing equipped.

Chuck Parallels

MAGNETIC chuck parallels, No. 124, have been announced by Brown & Sharpe Mfg. Co., Providence, for holding small work and work with projecting surfaces on the surface of magnetic chucks, either of the permanent magnet or electro-magnetic type. These paral-



lels, made of alternating steel and non-magnetic bronze strips, are $3\,15/16$ in. long, 7/8 in. wide, and 17/8 in. high, and are available only in numbered, matched pairs.

Diamond Nibs

BIG-HED diamond nibs for dressing grinding wheels, made by the Diamond Tool Co., Chicago, have been recently redesigned, incorporating a Loc-Key-Set. This new setting consists of two internal locking keys, integrally cast

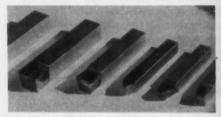


on the slug-holding nib. These keys are made by forcing the molten metal into two internal key seats milled in the nib head. It is claimed that diamonds set in this manner cannot shift, turn, or loosen in operation, making possible micrometer adjustment of each pass. Other features of the nibs are: A large diameter head that draws away heat from the grinding point and corrected face angles that permit greater tool clearance without loss of tool strength or rigidity.

Carbide Tipped Tools

A COMPLETE line of standard stock tools comprising six styles and 46 stocked sizes, all tools with diamond ground edges and ready for immediate use, has been

announced by Tungsten Carbide Tool Co., subsidiary of Michigan Tool Co., Detroit. Types suitable for cast iron, non-ferrous metals



and for steel are included in the line, and the tools are designed to cover the large majority of all turning, boring, and facing requirements. All styles and sizes in four grades are now available for immediate delivery, and other grades of Vascaloy, Carboloy, Kennametal, or Firthite tools are also available. Styles and sizes for cast iron and non-ferrous metals are furnished in gray shanks and those for steel have black shanks.

Boring Bar

A NEW double end boring bar for use with saddle type turret lathes has been announced by the Gisholt Machine Co., Madison,



Wis. The bar fits into the standard flanged tool holder on the turret, then through the turret, and is held on the opposite side by a short holder having four screws to grip the bar firmly. This arrangement makes an extremely rigid bar with large single point cutters for use with the cross feeding turret.

Diamond Tool Mountings

DIA - TOOL, INC., Yonkers, N. Y., has developed a method of mounting diamonds in a mat-

rix of sintered tungsten carbide. and offers for industrial use a variety of octahedron, elongated, and other diamond nibbed tools. Due to the shrinkage that takes place during the sintering process, the tungsten carbide matrix grips the diamonds more tightly than any other metal. The composition used in the diamond setting method has a coefficient of thermal expansion about equal to that of the diamond. resulting in a firm setting regardless of alternating heating and cooling during the tool life. Such mounting permits the diamonds to be used up completely without loss, as they will not come out of the matrix.

Carbide Tipped Tools

DESIGNED for interrupted cutting of steel castings and forgings in lathes, boring mills, shapers, and planes, four new styles of Kennametal-tipped tools are now available for industrial use. The tools have a negative shear angle of 35 deg., combined with a positive side rake of 15 deg., and are known as Kennametal styles 35, 36, 37, and 38. The principal feature of the tools is that the interruption in the work first strikes the tool behind the extreme point where the cutting edge is strong, and then shears off the chip with a progressive action. McKenna Metals Co., Latrobe, Pa., is the manufacturer of these tools.

Boring Bits

STANDARD type, carbide-tip-A ped boring bit that will meet most steel boring operations while requiring minimum grinding alterations for special boring jobs has just been marketed by McKenna Metals Co., Latrobe, Pa. The new boring bit has a 12 deg. positive back rake as contrasted to the 2 deg. negative back rake used on standard Kennametal-tipped turning tools. This back rake, combined with a compound front clearance angle, provides firm support to the cutting edge while allowing ample clearance. When used for boring, this tool will provide an effective back rake of -4 to +4 deg., depending upon the bore diameter. These tips permit high cutting speeds on steel up to 550 Brinell hard, with close tolerances, greatly reduce tool wear, and are free from "cratering" from steel chips. Right

and left-hand tools for six standard styles of boring bits are listed as styles 23 to 34.

Turret Lathe Tools

TWO new turret lathe tools, announced by Gisholt Machine Co., Madison, Wis., are available, one for end facing and forming and the other for pointing and chamfer-



ing. On each tool, the rollers, mounted on needle bearings, are easily set for diameter and support the work accurately and rigidly. Substitution of the roller support assembly equipped with straight rather than bevel rollers converts the pointing tool into an end facing and forming tool. Both tools may be used for light turning by substituting the proper cutter.

A NEW rapid slide tool for turret lathes also has been designed by Gisholt to hold small boring bars and forged cutters. Movement of the lever transmits a rapid, smooth motion to the slide permitting back-spacing and recessing operations to be performed quickly. Adjustable stops are provided for quick setting, permitting duplicate work.

Turning Head

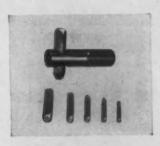
A NEW adjustable turning head for turret lathes has been designed for turning and boring

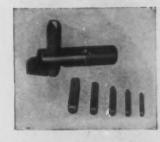


work, accommodating standard cutter holders in one of the two holes on the slide. Provision is made for mounting a drill, boring bar, or facing cutter. The slide is quickly adjusted to size by a micrometer dial and observations clips actuated by a ball crank handle. A long binder lever rigidly locks the tool slide, permitting heavy, accurate cuts, and the auxiliary slide is vertically adjustable. An extra large overhead pilot bar can be mounted on the machine or on the tool itself to support the tool. Gisholt Machine Co., Madison Wis., makes these turning heads.

Hand Tool Holder

A DEVICE to hold square or octagon shaped tools, such as steel hand stamps, chisels, and other hand tools has been developed





by M. E. Cunningham Co., 115 East Carson Street, Pittsburgh. This new, safe, adjustable hand tool holder is made to hold pieces from ½ to ¾ in., and pieces ranging from ½ to ½ in. The holder prevents smashed fingers and broken bits from the tool from flying and causing injury to workmen. Holders can be furnished with levelers on the front end.

Forming Tool Holder

A NEWLY developed circular forming tool holder for use on turret lathes was recently announced by Gisholt Machine Co. The device can be used on either the front or rear of the cross slide, since cutters may be mounted on either side of the holder. The cutter can be adjusted and locked so the cutting edge can always be properly positioned after grinding.

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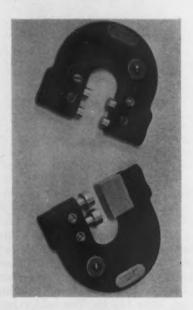
THE IRON AGE, March 19, 1942-61



The pivot mounting of the holder permits adjustment for correcting slight inaccuracies of the cutter.

Snap Gages

ATLANTIC adjustable limit snap gages is a new line of gages made in United States in accordance with American gage design standards. Gage frames are made of Meehanite castings, which have high tensile strength and will not warp or shrink. Atlantic gages are made in two standard types, model

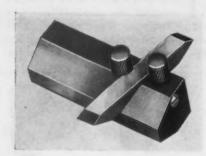


A with four gaging buttons and model C with solid block and two gaging anvils. These gages are made in 30 different sizes by the George Scherr Co., New York.

Thread Grinding Holder

A MASTER gage, said to position thread cutting tools at proper angle while being ground on surface grinders, has been announced by Acro Tool & Die Works, Chicago. It consists of a one-piece steel base, milled and slotted to position, and holds thread cutting tools at the proper angles on the grinding surface. The tool bit is held tightly

down within the slot by two knurled head screws, and a set screw takes up any lateral motion that may occur. The gage eliminates the necessity for continual testing because grinding operations are limited to



fixed angles, and permits the use of unskilled labor for such work.

Stamping Machine

A NEW nameplate stamping machine built by the Acromark Corp., Elizabeth, N. J., is exceedingly fast and accurate for stamp-



ing motor, combustion, and wiring specifications on pre-curved cylinder nameplates. The machine may be obtained in either hand or foot operated models, and assures that all characters will be stamped in perfect alinement. The die wheel is quickly interchangeable for differment sizes, which range from 1/32 to 3/16 in.

Hot Stamping Machine

RADUATED sleeves for binoculars are quickly marked with the new No. 9H marking machine. Formerly engraved or stamped and then enameled and white filled, markings can now be marked after enameling in half the time required by former methods. The machine marks various materials and applies the white or silver fillings with heat in one operation by means of an



automatically fed tape. The die is electrically heated with thermostat control, and the depth of mark is adjustable. It is built by *Acromark Corp.*, Elizabeth, N. J., and can be used for cold marking cylinders, cups, caps, fuses, shells, and other parts.

Operating Timer

TRIC & MFG. CO., East Pittsburgh, has developed a low cost time meter with a cyclometer that registers 9999.9 hr. in 1/10 hr. over a period of 11 years. The unit is especially designed to record the number of hours a given piece of machinery operates over a period of time. The unit is in a standard size $3\frac{1}{2}$ -in. diameter case, and is very compact.

Shell Marker

THE heavy duty No. 79 shell marking machine, developed for high speed marking of 105 and



155 mm. and 5 and 6 in. shells, has been developed by Jas. H. Matthews & Co., Pittsburgh. Required data is marked on the shell by interchangeable steel type, set up in a roller die in the machine. The type can be quickly changed, and the marking depth is adjusted simply. Shells roll down a gravity feed way and are automatically selected and ejected at high speed. Twelve 155 mm. shells can be marked per min.

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Machines That Multiply America's Industrial Man-Power. KEARNEY & TRECKER CORP., MILWAUKEE, WIS., U.S.A.

Milwaukee milling machi

Assembly Line

• Employment in converted auto plants turns upward... Capacity at Chrysler tank arsenal, now operating at 100 per cent, to be trebled... Detroit engineers get lowdown on old subject, production welding, with new aircraft industry implications.



ETROIT - Hand - to - mouth buying of industrial commodities has again become a measurable factor in the Detroit area for the second time in three months. It is now at the seven per cent level, which compares with the situation in mid-1940 when there was an extended period of hand-tomouth buying ranging from seven to 14 per cent. Data supplied by the Purchasing Agent's Association of Detroit for February indicates that government regulations and restrictions are entering the buying picture in an important way and forcing buyers back into this uncomfortable position. tendency toward short-range buying (within the 30 to 90 day range), has been quite apparent since last Fall, with 79 per cent of all the purchasing now falling within this range, according to reports. (See accompanying chart.).

These reports, along with others, justify the comment that general business conditions are "spotty" to "bad," although there is ample reason to expect improvement. The conversion of industries in this area to war work has put a stop to much activity that normally is reflected in business indices. Inventories are less than they were just a month ago and production, generally speaking, is lower (because of the cessation of the production of many civilian items). On the other hand, employment has increased in the last six weeks and.

as reported here last week, is likely to continue on the upgrade from now on.

OUNDRIES continue in bad shape. Hardest hit of all are the captive foundries operated by some of the major automobile companies. A gray iron foundry in the Valley area in Michigan is limping along at two days a week and a cast steel foundry in the same area has just gone into the electric steel business to try to replace automotive volume which has disappeared. One automotive executive has predicted that three out of four foundries operated by his corporation might be closed for the duration unless war goods requiring cast iron parts could be placed in them. A cast steel foundry at Houghton, Mich., has been closed and WPB announces that the complete plant, together with its steel foundry equipment is available for purchase.

On the other hand, the Willys aluminum forge plant, which only 10 days ago had ample unused capacity, has been loaded up. It is understood that one aircraft firm alone placed 65 different forgings on order for quantity production. The Ford Motor Co. has been searching for aluminum forging capacity and it is possible that this concern will install an aluminum forge shop of its own.

The first quarter of 1942 is near enough complete to justify a little summing up, and progress reports of this nature are now at hand from General Motors Corp. and Chrysler.

GM expects that its first quarter deliveries of war materials will show an increase of 50 per cent over deliveries to the government in the last quarter of 1941 and an increase well in excess of 100 per cent over the deliveries in July-September of last year. Fourth quarter deliveries in 1941 totaled \$158,300,000, an increase of 37 per cent over deliveries in the third quarter and were equivalent to an annual rate of production of \$633,000,000. Since then the production rate has been stepped up rapidly.

EXPENDITURES on war contracts are pyramiding at a tremendous rate also. In January, 1941, according to Alfred P. Sloan,

Jr., chairman of GM Corp., war expenditures were budgeted at \$11 billion for the fiscal year ending June 30, 1942. In January, 1942, the budget estimates for the war effort for the period to end June 30, 1943, were set at \$56 billion—more than five times the amount originally scheduled to be expended by GM during this current fiscal year.

In the 60 days following Pearl Harbor, according to Sloan, GM's share of the war program—based on having all projects under contract or under study ultimately running at peak production concurrently for a year—was multiplied 23/4 times.

Sloan now estimates GM's total peak employment of salaried and hourly paid workers will be 400,000 persons, compared with the previous peak of 292,000.

Chrysler's report reveals the sensational fact that its first tank commitments were completed seven months ahead of schedule.

Production at the tank arsenal is now at capacity, according to K. T. Keller, president, who also repeats that the tank program is going to be trebled and that \$40 million is to be spent on expansion of the arsenal.

Incidentally, trade circles understand that the heaviest part of the tooling program will be approached this summer at the tank plant, with equipment continuing to move in to the expanded production lines during the summer and fall.

MEANWHILE Chrysler is expending another \$6,000,000 to tool and equip its gun shop, although heavy anti-aircraft cannon have already been coming off Chrysler's lines in volume and the output is increasing month-bymonth.

The aluminum alloy forging plant operated by Chrysler to produce bomber parts continues to turn out its quota, and the other bomber parts are now being produced by Plymouth, Dodge, DeSoto and Chrysler plants, according to Keller. He reports that a large amount of equipment is already installed in the final assembly section of the bomber plant and that the assembly of fuselage sections has commenced.

An expenditure of more than

Todays treamlined gears must be GROUND

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When a gear can be comfortably overweight, muscle-bound, loose-meshing... then it can get along with less accurate finishing than a gear grinder provides. But the streamlined, fighting-trim, hard-working gears in today's aircraft superchargers, tank transmissions, and the like must be right. Total load-per-gear-tooth is greater, so load distribution must be even, constant, accurate. That calls for gear grinding... there's no shortcut, no substitute.

Pictured below is Yankee quality at work—a gear being ground. It's a P&W gear grinder; we can't reveal where it's being used or where the gear will go... but we can admit that the tolerance is a scant ±.0002"! Hardening distortions are being removed... this gear will be right... only grinding will do it.

Gear grinders — typical precision machines — are one of hundreds of classes of Pratt & Whitney tools now at work all over the country building America's strength for Victory.



\$20,000,000 is being made so Chrysler can produce more ammunition, an item on which volume production has nearly commenced.

Detroit's renewed interest in aviation was highlighted in the attendance at two recent technical meetings on aeronautical subjects, one of which set an all-time Detroit record by drawing an audience of some 1700 engineers.

One of the meetings was a perfect example of the fact that in many cases the automotive industry is going to sit at the feet of the aircraft industry and wait to be told "how." It was like bringing coals to Newcastle for an engineer to come here and tell Detroit engineers how to do production welding, but Paul Merriman, plant electrical engineer of Glenn L. Martin Co., Baltimore, Md., has had extensive experience that made worth while the attendance of about 450 members of the Society of Automotive Engineers and of the American Welding Society. He talked on "How to Increase Aircraft Output by Welding."

The lesson brought home in his address was an old one in Detroit but it had a lot of new implications; Merriman declared that constant control by the welding engineer from the design stage through to the final production stage and even into the inspection department is an essential requirement to successful production welding.

Aircraft spot welds can be "in-

stalled" 60 times faster than equivalent rivets, Merriman dedeclared, adding the assertion that, if 10 per cent of an airplane structure can be spot welded, there is a worth while savings. Actually, he said, 60 to 70 per cent of many aircraft structures are susceptible to spot welding.

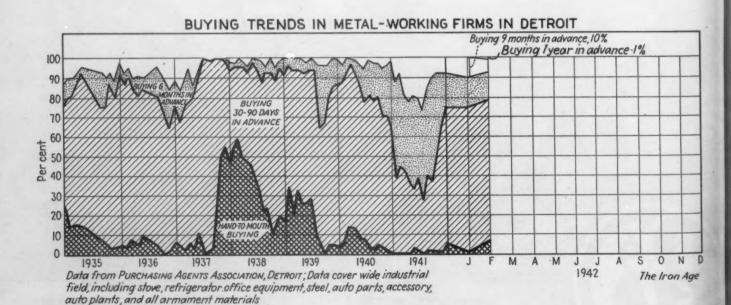
S OME tips he gave to automotive engineers were based on the assumption that sooner or later the engineers will be involved in original designs of their own in contrast to the present stage of the automotive-aviation program in which the designs are being supplied by older, established airplane plants. The fullest application of the welding process to the aircraft production must start at the drafting board, he declared, because it is here that the engineer must determine whether a part can be satisfactorily tooled for welding.

He advised on the selection of equipment, told Detroit engineers to reject types of design with many gadgets. "Those days are over," he said. Plant layout was another phase of the topic he covered. Sometimes the choice of equipment, as well as plant layout, depends on the power distribution facilities, the amount of "copper" that is available or can be used. Thus, he indicated that a small department, far out in a big plant, would be best served by a stored energy type of welder with a moderate KVA rat-

ing, whereas other circumstances might dictate the choice of other types of equipment ranging upwards to 700 KVA.

Maintenance was singled out by Merriman as being one of the most important problems in aircraft production welding. The collection and training of personnel, and supervision for the maintenance of "the things that look like part of your radio" was stressed very highly in his talk. He added that the maintenance men learn much about the equipment in service and that their tinkering frequently results in improvement of the equipment, the product, safety and quality.

The Martin engineer outlined a list of research projects which might be carried on continuously in connection with any aircraft welding program. Included he said might be: (1) New types of surface cleaning; (2) new types of electrode tips; (3) new types of alloys and tip contours; (4) the cooling of tips; (5) wave forms-the manner of introducing heat into welds, still a virgin field; (6) sequence of operations and pressures, etc.; (7) fatigue and corrosion of spot welds; (8) new types of equipment and new processes of welding such as butt welds. The quantitative determination of fatigue, he said, is still one of the most elusive problems to be solved by the welding engineer.



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The Road to
FASTER PRODUCTION
with Stainless Steel

THIS Stainless Strip is giving wartime production the Full Speed signal in many plants because it blanks cleaner and requires less finishing.

Largely as a result of Carpenter's metallurgical research—bright, ductile Stainless Strip is saving wear on dies that take a long time to make. It is speeding the production of plane parts, radio equipment, precision instruments and many other direct and indirect defense products. From Carpenter's vast experience with the selection and fabrication of Stainless Strip has come a "know how" that is

making the hard jobs easy and is getting the easy jobs done faster.

Take advantage of our metallurgical service to users of Stainless Strip. Your nearby Carpenter representative can give you the fabricating help you want on the Stainless Strip that meets your production needs. If you would like information on blanking, punching or shearing Stainless Strip, or if welding or riveting present problems—ask for Carpenter's Data Sheets on the operations that apply to your jobs. And if you need the Selector Slide Chart shown here, a note on your company letterhead will bring it to you promptly. Offer good only in U.S.A.

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best meets your requirements for heat or corrosion resistance. It gives quick answers to questions on fabricating conditions and physical properties. Free to Stainless Steel users in the U. S. A.

you which grade of Stainless

Washington . . .

 Appeals from M and L orders fall into six principal classifications, all keyed into expediting the war program . . . Only 10 per cent of appeals are allowed out of 1000 received per day.



ASHINGTON-WPB ognizes six main grounds for granting appeals from "M" and "L" orders, according to a recent survey conducted by THE IRON AGE of general appeals policy throughout the various WPB industry divisions. While the standards set forth are valid grounds for relief, for the present at least, facts which a manufacturer submits in making an appeal must adequately support his claim. Several WPB officials have suggested that appeals be presented simply, and not in the form of "a red ribboned lawyer's brief of 60 pages."

Appeals are coming in to WPB industry branches at the rate of 1000 a day. Only about 10 per cent are allowed.

The following are grounds recognized by WPB with respect to relief from materials and limitation orders:

1. If the granting of an amount of scarce material will hasten the firm's conversion to war production, permission may be granted to accelerate its production or scarce material consumption to cover up to 120 per cent of the firm's quota as set by the order for the period required for conversion, if such conversion is to be 80 per cent or more and will proceed without substantial interruptions.

I F conversion will be speeded, a firm may be allowed to produce replacement parts or other articles that will be needed for essential civilian products during any period up to three years after the effective date of the appeal decision, provided conversion to war production is to be 80 per cent or more, and if it is not feasible to have such replacement parts made by other firms.

If conversion will be quickened, permission to finish semi-fabricated inventory on hand will be granted if such inventory will be a serious impediment to conversion, to war production, or cannot be retained, used or sold for other purposes without serious financial loss, and will require only relatively small amounts of scarce material for its completion and no satisfactory substitutes for such material can be found to manufacture relatively essential end-products.

M ISCELLANEOUS grounds for relief based on the fact that if granted they will speed conversion are:

1. To hold personnel organization intact; to take over the quota or obligations of another firm which is converting to war production, if WPB approves; to produce or acquire any equipment or supplies which will facilitate the firm's conversion needed to carry out any other action in accord with the foregoing.

2. If conversion will be facilitated by the granting of an amount of scarce material that will not exceed the amount that will be saved in one year by the conversion, an appeal may be granted if it be shown that simplification or substitution will result in the saving of substantial amounts of scarce materials in the making of an essential civilian product. The same bases for appeal may be set forth which are indicated in Item 1.

3. If a limitation order would impose exceptional or unreasonable hardship upon a firm's production of essential civilian products, it may be shown that at the time of the order's issuance the firm did not exist and therefore could not limit its production on

the basis of a period when it was not doing business. Or it may be shown that during the base period of the order, upon which production was to be limited, the firm experienced subnormal operations because of non-economic reasons such as fire, flood, construction,

RELIEF may be granted from the terms of a limitation order which restricts certain materials, if a company can show that its production during the base period designated in the order was confined largely to types of product, or involved the use of substantial quantities of raw materials, not covered by the order.

Relief may likewise be given if it be shown that the amount of scarce material the firm requests is either exceptionally small or cannot be replaced by a substitute material without unreasonable expense or expenditure of other materials.

Any other circumstances may be set up to show that the order will cause exceptional and unreasonable hardship to the firm because of undue competitive advantage to other companies making the same product. However, a company must show that its operations during the base period were in reasonable accord with WPB objectives.

4. Unemployment which an order may cause is adequate ground for granting an appeal if the amount of scarce material consumed per man-hour is relatively small, and if the workers involved are not suitable for other employment, or cannot find other jobs within a reasonable time. It may be further shown that the resulting unemployment will cause the loss of skills or crafts that are deemed by WPB too important to be sacrificed.

5. An appeal may be granted if it is shown that substantial competitive inequities arose from lack of uniformity in the administration of orders, or incorrect reports connected therewith, or to permit a company to take any action which is in full accord with the

AMERICAN MONORAIL

EQUIPMENT

Helps Conserve Energy and Increases Efficiency

MERICAN MONORAIL Overhead Handling Systems play a vital part in speeding up production in hundreds of plants working on war materials.

American MonoRail Equipment relieves men from lifting and carrying and enables them to give full time to production—keeps materials and products on scheduled routes, without congestion, delay and damage in transit.

American MonoRail Equipment is engineered to meet the particular requirements of each problem. Supplied for manual, electric, or automatic operation. There is no delay or shutdown during installation. Let an American MonoRail Engineer show you how it can be done in your plant.



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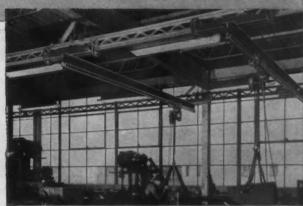
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 Light duty cranes with chain hoists solve the problem of handling heavy castings.



 Easy movement of hard-to-handle loads on a simple power operated MonoRail crane.



WRITE FOR Blue Book illustrating bundreds of Mono-Rail installations.

IF YOU Plan TO BUILD

The complete facilities of our engineering staff are at the disposal of any company—their architects or engineers—planning to expand or construct new buildings. This service is yours for the asking.



 Special double bridge crane with swivel features for quick removal and quenching annealing pots.

intent of an order but was inadvertently prohibited by it.

6. If the making of certain replacement parts or supplies is deemed to be non-essential to the United States, but proper authorities have said they are desirable for export to create foreign exchange or for other reasons, an exception may be granted.

Also a firm may be permitted to take any other action deemed by proper authorities to be necessary to lend-lease or other economic programs—the acquisition of excess inventory of scarce materials, or the exceeding of production quotas for export purposes.

Only Small Part of Lend-Lease Aid Actually Given

• • • The report on the first year of lend-lease activities transmitted to Congress by the President disclosed that out of the \$48,000,000,000 appropriated, only \$2,500,000,000 worth of actual aid has been given. Lend-lease pointed out that it takes six months to two years to translate appropriations into bombers, tanks or ships.

18 Metals Listed As Vital For War

Washington

• • • Eighteen metals are listed as materials most vitally needed for war purposes and not generally available for civilian needs, in the first of a periodic series of provisional reports on the relative scarcity of certain metals, issued last Thursday by WPB's Conservation and Substitution Branch of the Bureau of Industrial Conservation. Both ferrous and nonferrous metals are included in the list under the first of three groups. For these materials civilian industry must largely find substitutions.

In noting that the materials list was arranged in three groups according to their general availability for substitution or use in civilian industry, Harvey A. Anderson, chief of the branch, emphasized that the status of the listed materials and others, as well, is constantly changing in relation to supply and demand.

Materials listed in the second group are also necessary for war production and essential industrial activity, but the supply picture is not as tight. Necessary civilian industry may obtain limited supplies from this group to replace unavailable materials, when specific cases are considered to be sufficiently important.

The third group includes materials that are more available for substitutions, although in no case, it was stressed, can the supply be considered unlimited, since other factors than the material itself may determine the amount available. Among the items in the three groups of materials are:

Group I—Materials most vitally needed for war purposes; not generally available for civilian needs.

Metals—Alloy steel, iron alloys, wrought iron; aluminum; aluminum scrap; cadmium; calcium-silicon; chromium; iridium; lead, magnesium; nickel; tin; tinplate and terneplate; tungsten; cobalt; copper; copper scrap; tungsten, high speed tools; vanadium.

Chemicals — Chlorinated hyrocarbon refrigerants; chlorinated hydro-carbon solvents; and toluene

Miscellaneous—Burlap and burlap products; corundum; graphite, Madagascar; rubber, crude and latex, chlorinated, synthetic; tin cans; titanium pigments; and tung oil.

Group II—Basic materials that are essential to the war industries but whose supply is not as critically limited as materials in Group I.

Antimony; beryllium-copper alloys; diamond, industrial; diamond dies; mercury; molybdenum; natural gas; steel, carbon, scrap; manganese; and zinc, all grades.

Group III—Materials available in some quantities for other than strictly war purposes. However, the use may be restricted by accompanying manufacturing limitations. Restrictions are commonly imposed, but supplies are not critically short, except in the case of iron and steel.

Substitute materials—Coal and coke; feldspar; and iridium, plating.

Materials available in varying amounts for substitutions—

Petroleum products, crude oil, gasoline, lubricating oil, and paraffin; silicon and alloys.

War materials presently available for substitutions in critical civilian industry—basic low-carbon steel; bessemer steel; gray cast iron; and malleable iron.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Hollar Acting Director of Materials, Equipment Section Washington

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• • • Philip A. Hollar has been appointed acting director of the materials and equipment section of the Office of Defense Transportation. He succeeds Col. Charles D. Young, who has been called to active Army service. At the time of his appointment, Mr. Hollar was a member of the staff of the Association of American Railroads.

Consultants appointed to advise Mr. Hollar on technical matters pertaining to materials and equipment for various branches of the transportation industry are:

F. H. Hardin—Railroad freight, passenger, and all other types of cars. Mr. Hardin is president of the Association of Manufacturers of Chilled Car Wheels, New York.

Jerome G. Bower—Castings and miscellaneous items required in rail transportation manufacture and maintenance. He was formerly eastern representative of the Buckeys Steel Castings Co., with offices in New York. Charles T. Ripley—Steam, diesel and elec-

Charles T. Ripley—Steam, diesel and electric locomotives. Mr. Ripley is chief engineer of the technical board of the Wrought Steel Wheel Industry, Chicago.

H. L. Hamilton—Diesel engines for railroad

H. L. Hamilton—Diesel engines for railroad propulsion equipment. He is manager of the Electro-Motive Division of General Motors Corp., La Grange, Ill.

Irving B. Babcock—Buses, trucks, taxicabs, and replacement parts. He is president and general manager of the General Motors Truck Corp., Pontiac, Mich.

Harold C. Davis—Equipment and supplies for maintenance of buses and trucks. He is vice-president of Consolidated Motor Lines, Inc.

Robert F. Black—Equipment on which production has been suspended, including buses, trucks, fire-fighting apparatus, road work equipment, and work equipment for public utilities and communications companies. He is president of White Motor Co., Cleveland.

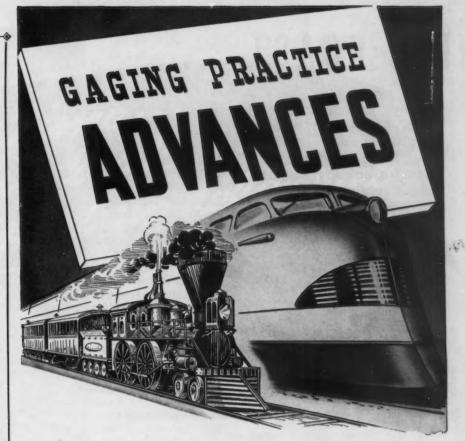
A. L. Viles—Rubber products, including tires, tubes, insulated wire, and belting and other mechanical rubber goods. He is president of the Rubber Manufacturers Association, Inc., New York, and chairman of the buying committee of the RFC Rubber Reserve Co.

Carroll W. Brown has been appointed assistant to the director of the section of materials and equipment.

Canada Prohibits Tin In Household Articles

Ottawa

••• G. C. Bateman, Canadian metals controller, stated that effective immediately, the use of tin has been prohibited, except by permit, for the making of all household articles. He also stated that except possibly for stove and other heating pipes and fittings, milk pans and oil pans and possibly for one or two other items, steel will not be available as a substitute.



Locomotives have improved vastly since those ambitious little wood burners struggled across the Union Pacific in the early 70's. The streamliner of today can do far more and do it much faster.

Never in history has progress been made more rapidly in pre-

cision gaging than in the last few years. Both standards of accuracy and gaging speed have made spectacular advances. The human equation, such an unpredictable factor just a few years ago, becomes much less troublesome.

Sheffield has its part in this march of gaging progress. It was Sheffield which produced the automatic gage illustrated—also the Electrigage, the Multichek Electrigage, the Precisionaire, the Thread Lead Checking instrument and others. If you are not familiar with what these instruments have accomplished in increased accuracy and faster inspection, write us for the story.





WEST COAST ...

• New expansion of steel facilities in California reported recommended by WPB... Coast area may be put under entire scrap allocation... Girdler opposes evacuation of plane plants.



San Francisco — Further expansion of raw steel facilities at Pittsburg and Torrance, Cal., mills was understood to be recommended last week by the War Production Board. This expansion would be the first undertaken in California since the United States entered the war and would bring the open hearth capacity of the two plants up to the level envisioned in W. A. Hauck's report to the OPM a year ago.

Columbia Steel Corporation's program announced last year is well on its way to completion. A large self-contained government financed plant with open hearths and finishing mills originally slated for Pittsburg several months ago was transferred to Provo, Utah, where it will operate in conjunction with four blast furnaces, government financed and Columbia operated.

Until the new Provo plant goes into operation, the Pittsburg and Torrance open hearths would be entirely dependent on purchased scrap for their operation. This would necessitate stretching further the limited amount of scrap now available on the Coast.

The general contract has been let and preliminary construction is under way on the Provo plant, which has been officially named the Geneva Works. The name is taken from the district in which it is located.

R URTHER operations in Utah may be presaged by the opening of bids last Tuesday by the Bureau of Mines for core drilling the Bull Valley iron project at the Milner property, in Washington County. These new drillings, in the southwest corner of the state, are not far from present Columbia Steel mines.

Possibly spurred by action on the Kaiser proposal, definite action, believed to be favorable, is imminent on the Bethlehem Pacific Coast steel program. The Bethlehem proposal, which originally appeared a year ago as a completely integrated blast furnace and steel plant in the Los Angeles area has been kicked about to such an extent that the original outline will not be recognizable. The current question mark is how the War Production Board was able to approve a Kaiser blast furnace for southern California when, as recently as Nov. 11, it had reported transfer of a proposed Bethlehem plant from that area because of War Department objections.

The Kaiser program, incidentally, now is reported to include balanced steel making facilities in addition to the original large blast furnace approved by the War Production Board. The steel furnaces and rolling mill would bring the original investment up to more than double the original blast furnace loan approved by the RFC.

Pacific Coast mills currently have on hand sufficient scrap to cover their immediate operating requirements, and with stimulation of automobile graveyard flow and industrial salvage, no curtailment of operation is in the immediate offing. The outlook for foundry scrap is more critical, and unless means can be taken to reverse the current supply-demand trend, increased curtailment will be necessary. Reports that the Lake Union Foundry, Seattle, had to shut its doors because of lack of scrap have proved to be erroneous, and Morel Foundry is the only one in that city which so far has ceased casting iron because of the scrap shortage. Morel continues to cast aluminum and brass, however.

RUMORS persist that the Pacific Coast area is to be made a guinea pig for complete scrap allocation. No substantiation is apparent other than the suitability of this territory, cut off from other scrap consuming areas, for such an experiment. Making allocations easier, too, is the small number of operating steel mills and the concentration of foundries at a few points. Allocation, too, might have the effect of driving foundries into more direct defense work. Although more than half, possibly threequarters, of current foundry work is defense rated, a large portion of the ratings are in the lower defense brackets. This is particularly true in the Pacific Northwest. Another argument for allocations is that under present practice scrap material to be made available by the automobile graveyard and industrial salvage program is just as likely to flow into foundries handling low rated work as to those supplying direct military needs. If this marginal scrap is to be made available at great trouble and expense, it is argued that it should go to those whose work is most important.

Another school of thought holds that no complete solution to the scrap problem in this area will be possible unless allocations and price control are brought under a single authority. The great gap between the regional OPA and WPB offices makes such a solution improbable, however. Although more authority has been delegated to regional War Production Board offices in the last two months, OPA activities are still hampered to some extent by concentration of policy making power in Washington.

Definite limitations to the amount of scrap that can be made available through the auto graveyard program appear in analysis of past registration figures. Normal automobile junking would produce a bulge in scrap from this source in 1942 and a still greater supply in 1943. It is now generally conceded, however, that new automobile rationing will cut mortality this year and part of next year, but that tire shortage will then reverse



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Passenger and commercial car sales in 1932 numbered 81,-340; 1933, 110,642; 1934, 136,147; 1935, 225,747; 1936 289,120; 1937, 284,174; and 1938, 172,575. The bulge in sales from 1934 to 1937 would normally mean that more automotive scrap would be available in 1942 than in 1941, and still more would come on the market next year. Another normally favorable straw in the wind would be the jump in total registration in the 1936-1938 period. Although fewer new cars were sold in California in 1937 than in 1936, total registration jumped from 2,270,921 to 2,-657.233. In 1938 new car sales dropped 112,000 but total registration increased 37,232. This counter-trend is apparently accounted for by migration of residents of other states to California. No means are available for checking the age of these immigrant automobiles.

Each automobile scrapped is, on the average, counted on to furnish approximately 1900 pounds of scrap. Assuming that the War Production Board's automobile graveyard scrap drive is able to accentuate the normal junking rate by ten per cent, 20,000 tons would be the top figure of additional material which could be made available this year in California, and 10,000 tons would be the top additional amount for next year. That is the cold statistical way in which to face the problem, and the pic-

ture is not encouraging. On the other hand, if the auto graveyard scrap program succeeds in keeping the scrap rates this year up to normal, it will be regarded as successful.

OAST shipyards are finally beginning to put into effect the full three-shift seven-day work week authorized over a month ago by joint union-employer government agreement. After ratification of the agreement, it is understood that the date at which around-the-clock work should commence was left up to the individual yards.

Only after the recent concerted public protest has the new schedule been put into affect in a wide scale.

One of the country's largest manufacturers of heavy military planes went on a three-shift production schedule at its California plant last week. It had been operating two nine-hour shifts six days a week. The new schedule involves a two eight-hour shifts and one six-and-a-half-hour shift each day, six days a week. Inability of suppliers to furnish parts and machine equipment has been stated to be the reason for past part-time operation.

Tom M. Girdler, now on the Coast directing Consolidated and Vultee aircraft production, last week added his voice to those who believe that aircraft factories now located on the Coast should not be evacuated.

"This country is not so helpless that it cannot protect these plants from possible air raids. Any interruption of production from that cause would result in only a fraction of the delay caused by the removal of these plants. We cannot afford that delay. I believe that these plants are on the Coast to stay."

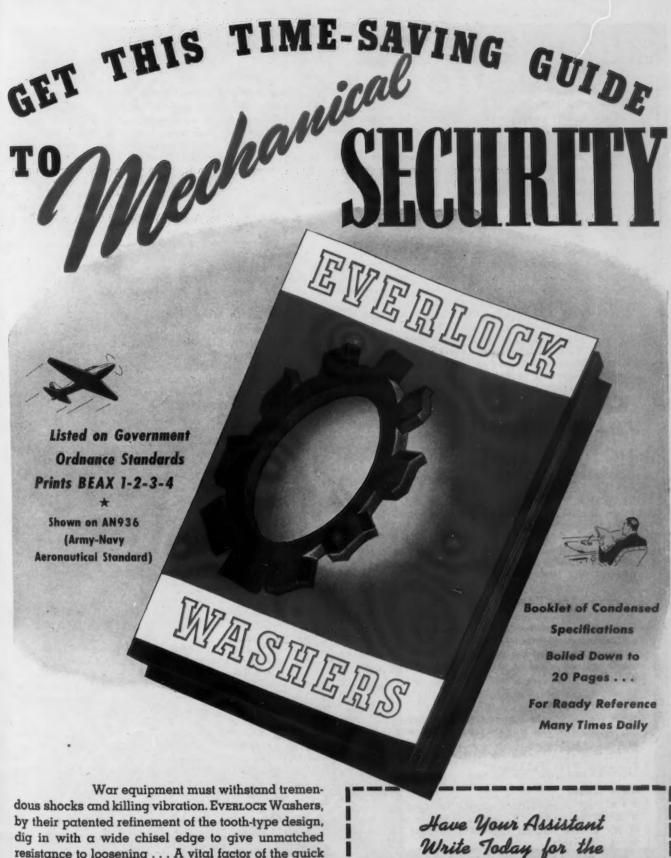
Mr. Girdler boosted Consolidated's B-24, stating that in his opinion it was superior to the Flying Fortress in many details, and pointing out that its production was mounting rapidly.

"We naturally have trouble getting material and machine equipment. That's no one's fault now. There is much talk about steel's ability to produce, but instead the question should be how much of the material needed in the production of vital steel products can be supplied. That question affects most the steel and aviation industries now."

PLANE PARTS FROM AUTO BUILDERS: Hundreds of former auto body production men at Briggs Mfg. Co., Detroit, are now turning out aircraft parts. This is the duct department. Briggs' seven plants in Michigan, Ohio, and Indiana are turning out all types of airplane, tank, and other armament parts, and has about \$375,000,000 worth of war orders now on the books.



74-THE IRON AGE, March 19, 1942



resistance to loosening . . . A vital factor of the quick security obtained with EVERLOCK Washers is the time saved. When work surfaces contact the formed tooth edges, a slight turn of the nut or screw locks it in place.

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Write Today for the EVERLOCK BOOKLET

Fatigue Cracks BY A. H. I

War Without Worry

• • • • When the Office of Censorship gets running full tilt we hope it aims one of Those Looks at most of the newspapers and news broadcasters for their outrageous perfuming of the war news. A half ounce of good news finds itself shouted in 96-point headlines, while a hundredweight of bad news is buried furtively in 8-point somewhere back among the furniture ads, like a litter of drowned kittens.

For the convenience of those who want their narcotic in tabloid form, some newspapers run a daily summary headed "Good News." As there is no counterbalancing "Bad News," he who reads on the run gets the impression that the United Nations are sitting pretty.

The cartoonists push the ball along by drawing Hitler, Hirohito and Mussolini in comfortingly ridiculous poses. Add the usual rosy editorial on war goods production, and Joe Citizen, whether he works in a plant or runs it, feels safe in continuing to believe that it is somebody else's war, not his.

Daily a thousand headlines negate Donald Nelson's urgent warnings that the war won't be won in a walk. The excuse for dry-cleaned war news may be that straight reporting is hard on circulation figures and Crossley ratings, but the result is a ho-hum attitude of dismaying proportions.

We hear that in many plants there was an astonishing rise in output immediately following Pearl Harbor. It lasted until the shock wore off. We could do with less aspirin, and more iron tonic, no matter how bitter.

Killed by Improvements

• • • Even though the author of "Pack Up Your Troubles in Your Old Kit Bag" did commit suicide the other day we still think optimism is wonderful, provided it doesn't interfere with the job in hand. There is the story of the man with the sick wife, who was told daily by the doctor, "Don't worry. She's improving." After she died he told his friends, "She died of improvements."

Curling at the Edges

• • • "I am about ready," writes Deac, "to lower the boom on the headline, 'Take Heavy Toll.' Too often it smokescreens a serious setback."

And may we suggest timidly that as an advertising headline "Let's Look at the Record" has lost its school-girl complexion?

Plan for Peace

• • • We see by the papers that a painless solution to the world's troubles may be found in a poem published in the *Congressional Record*. It is by the Hon. Horace C. Carlisle of Alabama and is entitled, "Let Us Have Peace and Wars Will Cease."

Irate Client

• • • New abbreviations should be used cautiously, A. W. Miller warns. He says a publicity agent friend of his almost lost an important account because he wired his client:

SEND DETAILS NEW PLAN FOR RECONSTRUCTION PACIFIC COAST PLANT SAP

The final word, designed to keep the telegram within the ten-word limit, is of course merely an abbreviation of "soon as possible."

Stopper

• • • Mr. Howe was ahead of his time—and so are you!

—Jones & Lamson Machine Co.

Abou Ben Adhem-Thrice

• • • As you would suspect, the desire of industrial advertisers to know what industrial journals lie nearest your heart amounts almost to a passion. When they ask us we tell them frankly that the answer is in the lower left hand corner, between the page number and the date.

But we are only moderately happy when they say, "Yes, that's what I thought." We much prefer the skeptic who says, "You may be right, but on the perhaps uncalled for suspicion that you are slightly prejudiced, I will find out for myself." And forthwith proceeds to send a questionnaire to his customers and prospects, asking "Which publication do you like best?"

Within the past five weeks we have heard of three such surveys, and what publication do you think broke the tape each time? We're blushing.

Every Little Movement

• • • The inventive ability of the artist who illustrates Wallace Barnes Company's house magazine, The Main-

spring, continues to awe us. His job it is to elucidate a particular point in spring design or spring properties through the medium of a suitable picture.

A recent assignment was to make graphic this phrase, "For an application requiring flexibility and repeated cycles through a range of motion." His selection strikes us as just about perfect.



He Lay Awake Nights

• • • • The members of the brains department lie awake nights thinking of ways to makes life lovelier for you. Many a boon to you was conceived in a nocturnal cerebral session. Take, for instance, that 20-page manual of OPA price ceilings. The brains department's lank, dark Don James asked himself, "Would not the industry find great value in a booklet giving the price ceilings on practically everything on which OPA has set a top price?"

Receiving an answering "Yes," he worked a ten-day double shift preparing the manual, and we don't know how much money it has saved the industry, but last Thursday one firm told us in high elation that it had just put in a claim for a whopping big amount of overcharge and on Friday another firm told us exactly the same thing.

Both found they were paying more than ceiling prices for certain materials. We are being swamped with demands for the manual. Most people call it the price pamplet, phamplet, or phamphlet. If you mislaid yours you can get another for 25c. in stamps sent to us at 100 E. 42nd St., New York.

Bespoke

• • • • A recent ad in *The Aeroplane* reads "Die Sets—Bespoke or Ready Made." Sounds quaint to our ears. We guess (which sounds quaint to English ears) that "bespoke" means made to order.

Problems

days, B in 17 23/41 days and C in 27 9/31 days.

A solution to this in 45 seconds keeps you up in the top ten per cent:

A glass is one-third full of wine. Another glass of equal capacity is half full of wine. Each is filled with water and their contents mixed together in a pitcher. Half the mixture is poured into one of the glasses. What part of this is wine?



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Dear Editor:

SPINE-STIFFENER

If you have reprinted loose sheets of Mr. Van Deventer's editorial in the February 26 issue, please mail me as many copies as you can spare. I would like to distribute these where I feel that some education is in order.

As one American citizen, somewhat confused and bewildered by the chain of recent events, I would like Mr. Van Deventer to know that his editorial has stiffened at least one spine.

GEO. C. HARGROVE. President

The Hargrove Company Des Moines, Iowa

JIG AND DIE DESIGN

Can you recommend a book on jig and die design?

JAMES H. CUNNINGHAM Metal Products Engineering, Inc. Los Angeles, Calif.

• "Tool Design" by the American Technical Society, Textile Blvd., and 58th Street, Chicago, written by C. B. Cole, is one of our favorites. Other good ones are "Pressworking of Metals," by C. W. Hinman, McGraw-Hill Book Co., 330 West 42nd Street, New York City; "Die Designing and Estimating." American Industrial Pubmating," American Industrial Fublishers, 2460 Fairmount Blvd., Cleveland; "Punches, Dies & Tools" by Joseph V. Woodworth, published by Norman W. Henley Publishing Co., 2 West 45th Street, New York City, and "Jig and Fixtures," by Fred H. Colvin and Lucien L. Haas, published by McGraw-Hill .- Ed.

TECHNOLOGICAL ADVANCES

Dr. Alfred P. Haake, of the American Economic Foundation, suggested that I should write to you with regard to data and reprints on a subject in which I am interested, that is, the relation between technological improvements and unemployment, social conditions, etc. Any assistance you can give me in this direction will be greatly appreciated.

L. A. GRITTEN

Oregon Independent Telephone Assn., Forest Grove, Oregon

• The series, "The Threat to the Machine," by John H. Van Deventer, published serially in "THE IRON AGE" during 1939, is now available in reprinted form .- Ed.

PRODUCTION SCHEDULE

Do you have an article on the follow-up of production items through

the shop and a complete production scheduling outline?

R. L. STOTLEMEYER

Barrett Equipment Co., St. Louis. Mo.

• The subject of production planning is so broad that it can hardly be covered in less than a book. We recommend John Wiley & Sons' (New York) "Plant Production Control," by C. A. Koepke and Ronald Press Company's (New York) "Industrial Engineering and Factory Management," and "Cost and Production Handbook." -Ed.

SCRAP SOURCES

Sir:

I wonder if any of the brain trust have analyzed the heavy scrap potentialities existent in this country today in the following groups:

1. The terrific tonnage available in decommissioned and unusable naval vessels-the Philadelphia Back Bay, and Bremerton Washington shipyards are two good places to look.

2. The great numbers of guns, tanks and other memorials of the last war, to be found in every village and hamlet the country over.

3. The great amount of automobile scrap being held in junkers' yards everywhere that cannot be forced into the open until a ceiling is put on scrap.

4. The vast amount of old rigs, boilers, derricks, and other heavy metal parts that strew the oil fields from East to West.

5. The great accumulation of heavy junk that is to be found in almost every construction company's repair

If an aggressive, intelligent effort was made to secure the heavy melting scrap available in these places, I believe you would find the scrap shortage would diminish quite quickly, at least over the coming eighteen months.

LOU W. KREICKER, President

Advertising Producers Associated Chicago, Ill.

WAR FORECAST

I just had occasion to review two articles by Col. H. A. Toulmin, Jr., in your July 1940 issues. It would be enlightening to many business men to see reprints or a restatement of the facts, toned down to fit our present state of affairs. Anyone with a 1940 file will profit from the time taken to search out the July 18 and 25th articles.

W. H. BROOKS

Carnation, Co. Oconomowoc, Wis.

PLASTER MOLDS

Could you send me a reprint of the article, "The Use of Plaster Under the Capaco Process in the Production of Non-Ferrous Castings," published in your Oct. 9, 1941, issue?

A. R. MUELLER

Certain-Teed Products Corp.,

Buffalo

· The demand for this article was so great that it was necessary to make reprints. Copies are now available.-

REFUGEE WANTS COPIES

I have had the pleasure to come across a few copies of your IRON AGE, and although they were over two years old, I took great interest in reading them. As I am a student of engineering and very eager to come into contact with the various processes, may I request you to send me any copies you may be able to spare. By monetary regulations, I am not permitted to purchase your publication, but I would be very thankful if I could read it despite this handicap.

SALOMON H. LASSMAN

Refugee Camp Ottawa, Canada

· Copies of several back issues have been sent to Mr. Lassman. If any Canadian subscriber has unwanted files of back issues, he might want to send them to this refugee camp.-Ed.

VIBRATION ABSORBER

Some time ago you had an article describing steps taken by a firm which operated drop hammers in a residential district to put these on bases so that most of the vibration and shock would be eliminated. We would appreciate it if you would send us a copy of this number.

C. A. HAMPLE

Gregg Mfg. Co., Ltd. Winnipeg, Canada

• See Korfund, Inc., 48-15 32nd Pl., Long Island City. This firm has put installations in many of the airplane plants. You can stand right beside one of the operating drop hammers and feel no shock whatever .- Ed.

NO RETREAT

If you have reprints of "No Retreat Behind the Lines," by Mr. Van De-venter, in the March 5th issue of IRON AGE, please send us 12 copies. This message should be sent to every family in the U.S.A.

G. G. REYNOLDS

National Malleable and Steel Castings Co., Melrose Park, Ill.

78-THE IRON AGE, March 19, 1942



T & W FORGINGS FOR WARTIME INDUSTRY

T & W FORGINGS ARE BEING MADE FOR A WIDE VARIETY OF WAR EQUIPMENT AND INDUSTRIAL EQUIPMENT USED FOR THE MANUFACTURE OF IMPLEMENTS OF WAR. THE PERTINENT FACTS ABOUT T & W FORGINGS AND FORGING SERVICE ARE PRESENTED IN THESE BRIEF STATEMENTS:

Drop and Upset Forgings: T & W produces drop and upset forgings weighing from a few ounces up to 800 pounds from carbon, alloy, and special steels.

Forging Dies: T & W operates one of the largest and most skilled die-making departments in the industry, utilizing the most modern die-sinking machines with which to accomplish the completion of dies in record time. T & W die-craftsmen are responsible for the fact that T & W forgings usually cost less at the point of assembly.

of assembly.

Inspection: T & W inspection is responsible directly to management. T & W forgings formed in T & W dies pass the most rigid and exacting inspections because they are of unusually sound

physical structure. T & W inspection includes every modern device, and method, used for the inspection of forgings for aircraft and other war equipment. All inspection is done within the privacy of the T & W plant.

Engineering Assistance: T & W engineers are cooperating with designing engineers to simplify designs and conserve critical materials, and speed up the processes of forging and finishing of forgings. These engineers are seasoned by years of close work with engineers in the aircraft industry, automotive industry, machine tool industry and many other industries now engaged directly or indirectly in the manufacture of war equipment. They are experienced in handling hundreds of different shapes and sizes of forgings for use in several different kinds of equipment.

Consult a T & W Forging Engineer on your next forging job.



THE POINT OF

TRANSUE & WILLIAMS STEEL FORGING CORPORATION

ALLIANCE, OHIO

SALES OFFICES: NEW YORK . PHILADELPHIA . CHICAGO . INDIANAPOLIS . DETROIT . CLEVELAND

This Industrial Week . . .

TANK plants this week were contributing notably to the favorable news concerning conversion of U. S. industry to a war basis.

While the nation's arms program is lagging in some important aspects, the tank industry, which must equip Allied armies for the invasions of enemy territory to come, is making marked progress.

Chrysler, for example, reports that its first tank commitments with the Government were completed seven months ahead of schedule, that production at its tank arsenal is now at capacity, that its tank program will be trebled and that \$40 million is to be spent on expansion of the arsenal.

Such a showing by one of the large automotive companies, with its concentration of technical know-how and resources, is not unexpected. It is the entry of small plants into the tank picture that industry finds most interesting.

Iron Age Told of Armor Plate Plans

Already, THE IRON AGE is told, a group of more than a dozen automobile spring and bumper companies have been organized to manufacture tank armor plate. These companies, in an outstanding example of self-starting conversion of peacetime plants to war output, within two months will begin production of light armor plate at a rate which by the end of 1942 will reach many thousands of tons monthly. Armor plate orders totaling hundreds of millions of dollars have already been awarded to these spring and bumper companies.

The parent subcontractor in this armor plate group, which eventually may include as many as 30 companies in a conversion of the entire spring and bumper industry, is a Western Pennsylvania concern which had gathered information for a year regarding conversion of its facilities to

armor plate manufacture. All of this information has been turned over to its peacetime competitors who are preparing to fabricate and heat treat the plate for assembly by tank manufacturers in Michigan and elsewhere.

In a step designed to simplify the system under which material for tanks is distributed, the War Production Board has notified manufacturers of light and medium tanks and armored half track vehicles that they must apply for preference ratings under the Production Requirements Plan. In the meantime, these manufacturers will receive priority assistance under orders P-25-a, P-25-e, P-26-a and P-35, all of which have been extended through May 30.

Turbine Plant Being Built

Moves to widen many vital war production bottlenecks have been taken in the last few weeks or are about to be taken. A new plant to turn out turbo-generators and turbines is under way for completion by next July. An extremely large arsenal, which is to be a duplicate of a widely-publicized midwestern plant, is to be built in Ohio, and efforts to obtain the necessary machine tools and other equipment will be started shortly. Another important midwestern

war project is the plan by a leading steel company to manufacture steel tubing for aircraft construction. An idle plant in Ohio is to be utilized in manufacturing bayonets.

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U.S. Offensive Appears Likely

Signs are appearing at many points in the metal working industry that the United States is planning for an offensive war. Steel order backlogs show, for example, that hundreds of thousands of tons of sheets and wire mesh will be utilized in 1942 for airplane landing mats.

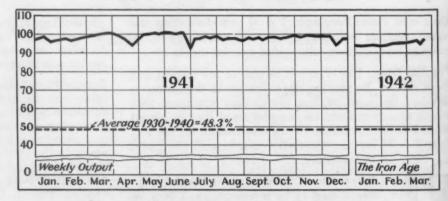
From now on, orders affecting the production and use of vital materials like steel will grow still more severe. The biggest industry to be halted, for conversion to war implement manufacture, has, of course, been the automotive industry.

This week, the construction industry is being placed on the block for the good of the nation. All construction will soon be stopped by an order of the War Production Board. After the stop date, all new construction will be licensed, so that vital metals and other materials may be directed to the war effort.

While details of the constructionhalting order have not been fully worked out, building of houses may

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts-Per Cent of Capacity

| Pitts- | Chi- Youngs- Phila- | Cleve- | Buf- | Wheel- | Ing | South | Chi- Youngs- Phila- | Cleve- | Buf- | Wheel- | Ing | South | Chi- Youngs- Phila- | Cleve- | Buf- | Wheel- | Ing | South | Chi- Youngs- Phila- | Chi-

be forbidden except to house war workers. Such structures as bars and bowling alleys will no longer be built and more important, farm buildings, if allowed at all, will be restricted on a minimum of metals basis.

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Reasons for the coming ban on buildings are readily discernible. With orders for steel to be used in defense plants and military bases continuing to pour in, the steel reinforcing bar situation has become critical. All the orders now being placed bear high priority ratings.

Recent allocation of structural shapes for production of freight cars still leaves unsolved the problem of how to make rails, munition steel and structural steel off the same mill, in some cases, when all three items are under practical allocation.

To some observers the steel industry seems closer than a week ago to the point at which the War Production Board will have to consider the absolute allocation of all available ingots to finishing facilities so that Army, Navy, Maritime Commission and lend-lease needs may be met on schedule.

Non-War Steel Still Made

Meanwhile, some steel continues to go into uses other than for military purposes. In this category would fall the sheet steel being supplied to a desk manufacturer who has high priorities for many thousands of desks on his order backlog. Consumers of steel tubing and of steel wire in some cases are manufacturing products which are far from being vital or even useful to the war program. Such diversion of material needed by war plants is caused by weak spots in the priorities system.

Steel ingot production this week reached a new high point of 97 per cent of capacity, an advance of a point over last week's revised rate of 96 per cent, according to The Iron Age estimate. Part of the rise appeared due to a slight seasonal improvement in scrap shipments, a reflection of early spring weather reported in some areas. Nevertheless, the scrap shortage remains the chief retarding factor in efforts to lift steel output.

The only important steel pro-



TRAINLOADS OF M-3 TANKS, above, are shipped from the Chrysler tank arsenal each day and the plant is currently undergoing a \$40 million expansion which will triple its output.

ducing area to show a loss this week was Pittsburgh, where operations are down one point to 97 per cent of capacity. Chicago operations rose a half point to 104 per cent, while Youngstown advanced a point to 100 per cent. Eastern Pennsylvania gained a half point to 91.5 per cent and Cleveland climbed 11/2 points to 96 per cent. Districts with unchanged steel production rates this week are Buffalo at 90 per cent, Wheeling at 83 per cent, Birmingham at 99 per cent and South Ohio River at 88 per cent.

Shipments of steel plates, long a bottleneck, are expected to reach 800,000 tons in March and go still higher in April. February shipments of plates established an all-time record of 758,723 tons, despite the shortness of the month, compared with 754,522 tons in January. Strip mill production of plates in February amounted to 268,988 tons, a gain of 18,000 tons over January while shipments of plates for the merchant shipbuilding program last month climbed 15 per cent.

News of further expansion by the steel industry came this week in an announcement by Pittsburgh Steel Co. that it will build a new blast furnace and reports that the War Production Board will recommend further expansion of openhearth capacity on the West Coast.

How strikes affected production in 1941 is shown in the U. S. Steel Corp. annual report. The loss to this company alone is given as 300,000 tons of steel, 5,000,000 tons of coal and 19 days of ship production.

Requests for pig iron allocations for April declined an average of 10 to 12 per cent from March, following warnings by the WPB against over-ordering. Orders for B-rated tonnage for April are down 10 per cent, continuing the steady decline in this type of business placed during recent months.

Lack of coordination in timing of deliveries of machine tools with the actual ability of the high-rated user to place such equipment into operation continues to result in a loss of production time for much war equipment. In the latest case brought to the attention of The Iron Age, two jig borers were delivered a month ago to a plant which will not be completed for another month. Meanwhile other war plants are losing valuable time waiting for this badly needed equipment.

NITRALLOY STEELS

-- prolong the life of WAR EQUIPMENT



The well known wear-resisting qualities of the extremely hard surfaces obtainable with Nitralloy Steels have made Nitralloy essential for parts for tanks, planes, ships, guns and other war equipment. We are in a position to furnish Nitralloy Steels hot rolled, heat-treated, annealed, turned or centerless ground.

COPPERWELD STEEL COMPANY WARREN, OHIO

ARISTOLOY STEELS

CARBON TOOL STEELS ALLOY TOOL STEELS
AIRCRAFT QUALITY STEELS STAINLESS STEELS
NITRALLOY STEELS BEARING QUALITY STEELS



British-Combine Photo

40,000 A YEAR: According to Lord Beaverbrook, Britain is producing 2-pounder field pieces at the rate of 30,000 a year, and by the end of 1942 the output will reach a rate of 40,000 a year. Here is a British gun factory, in full swing operation.

Ceiling on Wages in Canada Satisfactory For War Industries

Toronto

• • • Canada's wartime wage regulations, establishing a ceiling on wages, effective last Nov. 15 and followed a month later by ceiling prices on many civilian commodities, were introduced for the purpose of curbing inflation and at the same time bringing harmony out of chaos in the Dominion's war effort. From the viewpoint of war industry the regulations have proved highly satisfactory because practically all wage differences have been settled and the few strikes that have developed in the past three months have been chiefly for the purpose of gaining CIO recognition. The most prolonged strike since the introduction of the wage ceiling was that at the gold mines in the Kirkland Lake area, where CIO leaders, contrary to government regulations, endeavored to obtain an increase of 15c. per hour and chiefly to gain CIO recognition. This strike proved a total loss to the strikers. Efforts now are proceeding to have the laborers reinstated but work has Plews Gndustry

been found for only a small number of the strikers.

The wage rates set by the government are the minimum and maximum paid between 1926 and Dec. 16, 1940, with each company governed by its own minimums and maximums. Thus, each concern has its own established wage rates which it must adhere to irrespective of the fact that some competitor had a higher rate during the fixed period and can pay the higher scale. In addition all concerns employing 50 persons or more are required to pay a cost-of-

living bonus equal to 25c. per point above the 100 level established as at September, 1939. This index now stands at 114.6 and the cost-of-living bonus is \$3.65 per week.

While the ceiling on wages, maximum prices on foods and commodities and the cost-of-living bonus. have practically eliminated strikes in Canada, they have not proved satisfactory altogether. To a large extent they have satisfied labor demands in most war industries, for which they were primarily established. On the other hand, those firms forced to hold to the lower wage brackets as a result of their lower scale during the period taken for minimum and maximum wages, now find they are unable to keep their skilled laborers. The men throw up their old jobs to seek new positions with war industries paying much higher rates.

Also, the cost-of-living bonus plan has proved a bone of contention. Previously it was announced that all firms, irrespective of the number of employees, were required to pay this bonus on and after Feb. 15, 1942. A subsequent government order prohibited any bonus payments by firms that had not previously paid them to that time and also any increase in

wages without the approval of the regional offices of the National War Labor Board.

Industrial and business leaders claim that the government's regulations governing wage payments are proving quite satisfactory insofar as prime war industries are concerned, but have created a general feeling of dissatisfaction in other branches of industry and offices where no recompense or recognition is allowed with the higher cost-of-living.

WPB Allots Coke For Eastern Stack

By T. C. CAMPBELL (Pittsburgh Resident Editor)

• •• The War Production Board recently allocated by-product coke from a commercial by-product coke plant to an Eastern blast furnace following a complaint of the latter that the use of beehive coke from the Connellsville region was

of such quality and structure that it affected pig iron production.

Recently the number of complaints about the structure and quality of beehive furnace coke has increased from blast furnace operators, but little known, apparently, is the fact that such condition can in many cases be traced indirectly to the recent \$6 ceiling placed upon beehive furnace coke.

The squeeze play predicted recently (THE IRON AGE, Jan. 29, p. 80) whereby certain marginal coke operators might find it difficult or impossible to continue operations very long unless they were afforded specific price relief, seems to be making its appearance. Such a situation, if it grows worse, could conceivably affect pig iron production unless the WPB is prepared to go further and increase the number of allocations of byproduct furnace coke produced by merchant plants. The latter course, however, might run into increased freight costs as well as distant locations from source to consumption.

Within recent weeks the beehive coke industry in Western Pennsylvania has been struggling against a series of factors, many of which are indirectly traceable to the imposition of the recent \$6 ceiling price. Admittedly, all coke operators are not facing the same difficulties but nevertheless a large proportion of independent operators are becoming affected.

The quality and structure of beehive furnace coke in many instances has been affected recently to such an extent that coke operators are worried. The increased use of lower grade coal because of the working out of good coking coal veins has been necessary on the part of some operators in order to keep their ovens in operation. However, this type of coal frequently produces high sulphur coke with a high ash content. Too much high sulphur coke in a blast furnace charge obviously cuts down pig iron production owing to the increase in the limestone load to reduce the high sulphur.

Coke structure in many cases has become soft and weak due to the slower charging of the ovens which in some respects has been caused by the long distances from which some of the coal must come.

CANADIAN MORTARS: Important among the light weapons of the Army are trench mortars, which are now being turned out in quantity in Canada. Here a worker in a Hamilton, Ontario, factory gives a row of 2-in. mortars a final check-up before shipment.

British-Combine Photo



UNDERGROUND PLANTS: British aircraft is being built in underground factories, established in abandoned quarries. Modern illumination and air conditioning furnish comfortable working conditions for "around the clock" production. Deep below the surface, these plants are immune to bombing attacks and nature provides the best possible camouflage for them.

Acme News Photo



84-THE IRON AGE, March 19, 1942

Trucks which at one time were hauling coal only three miles now must go as far as 12 miles, and the supply of trucks has also been curtailed, both physically and because of the tire situation.

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The labor angle has also entered into the slower charging of the ovens because a substantial number of experienced coke oven operators have been drafted. There have also been isolated cases of strategic maintenance men being stolen from one plant by another one. To combat this situation, some coke operators have had to hire young and old inexperienced help which has contributed to a slower charging circle and hence chilled ovens. The latter condition invariably produces a coke structure not acceptable or desired by many blast furnace operators since it means an increase in the amount of coke per ton of pig iron produced.

Even more alarming recently is a shortage of miners, many of whom have been drafted or have gone into other work. An unusual development is the appearance of an ad in a Pittsburgh newspaper offering jobs for 100 miners. With coal consumers stocking up heavily and with some coal operators being forced to advance their price of coal as much as 25c. a ton, the small independent coke operator seems to be caught in the middle.

Aside from troubles in the process of making coke, the coke operator is also directly affected by the mining situation which at the present time is not producing enough good coking coal and not producing as much coal from present sources as was the case a few months ago, the latter due primarily to the labor conditions, the exhaustion of coking coal properties, and the longer hauling distances.

There have been a few isolated cases where marginal producers were forced to shut down their ovens. Eventually it is believed the OPA will have to either make individual or general adjustments for the marginal coke operator whose costs prohibit him from operating under a \$6 ceiling or the WPB will have to go to greater allocation of merchant by-product furnace coke to blast furnaces if a subsequent loss in pig iron production is not to result.

Superior Ore Usage May Hit 90 Million

Cleveland

• • • Indications point to record consumption of Lake Superior iron ore this year, perhaps in the vicinity of 90,000,000 to 95,000,000 gross tons. This is based upon the continued driving of blast furnaces, the increased use of ore in open hearths and bessemer furnaces to offset scrap shortages, and the probability that Lake Superior ore will be required by furnaces formerly depending upon imported Latin American ores.

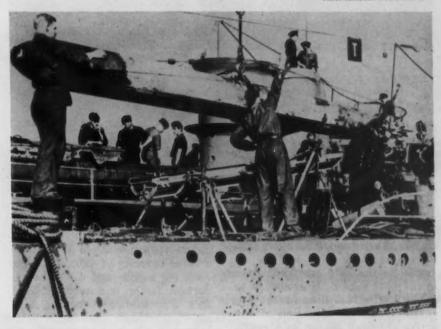
There is a leeway of about 23,-000,000 tons of ore on Great Lakes docks and at furnaces. The amount that the 1942 ore movement falls short of the 90,000,000 tons that may be required this year will reduce stocks by that much.

Shipping interests have been busy all winter repairing and fitting out their boats to put them through a stiffer operating season than any on record. Underground miners have been busier than usual.

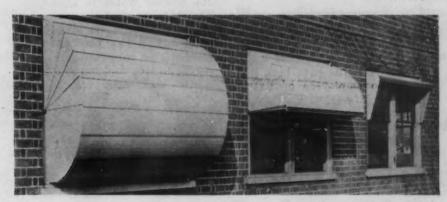
'Open pit miners have secured considerable equipment, particu-

WITH MALICE TOWARDS U. S.: Here members of a German submarine crew are shown loading torpedoes at a German sub base as preparations are made for an assignment, probably in the North Atlantic.

International News Photo



BLACKOUT AWNING: Meta-Fold awnings, made by Acklin Stamping Co., Toledo, are metal awnings that can be used for sun protection and black-outs, and operate as simply as a roll top desk. The metal awning gives protection from flying splinters and concussion. Permanence of installation requires no seasonal storing, full use of daytime light, and full illumination of light leaks at night.





Wide World Photo

LABOR AND THE WPB: Left to right, William Green, president of the AFL; Donald M. Nelson, chairman of the WPB; and Philip Murray, CIO chief, met on March 7 to discuss war labor problems.

larly trucks, which were on order many months ago.

Reports continue that 12 automobile carriers may be converted into use as ore carriers, but this matter apparently has not definitely been decided upon at this date. On the other hand, it is likely that more Canadian ships will be diverted to the lake ore trade than in the 1941 season. Permission to increase the load line of the ore carriers and an extension of the active shipping season as a result of agreements with underwriters make the required 90,000,000 ton ore movement a firm possibility, unless severely adverse weather is encountered.

Navy E Certificates Given B. & S. Employees

• • • • Award cards have been distributed to employees of Brown & Sharpe Mfg. Co., Providence, R. I., as a record of the distinction conferred on the company by the Navy Bureau of Ordnance. The cards carry the name of the individual to serve as a permanent reminder, in addition to the Navy E pin.

Canadian Plate Mill To Begin Operations April 1

Toronto

• • • The rebuilt 110-in. plate mill of Dominion Steel & Coal Corp., Ltd., Sydney, N. S., which will commence operation April 1 will have a rated capacity of 180,000 tons of plate per annum and will be an important factor in extending Canada's shipbuilding program especially merchant vessels. Officials have not stated as to whether the mill will operate at capacity, as the production rate will depend on the availability supply of steel for the mill. Also nearing completion at the Sydney works is a new open hearth furnace which is being installed to provide the steel for the plate mill. A new blast furnace is to be started immediately and is expected to be completed and in production early next year. It is not expected that the blast furnace will result in any big increase in pig iron production by the company, but the enlargement to blast furnace capacity is necessary if the company is to maintain its present production rate when its stacks have to blow out for relining and repairs.

20 Locomotives Ordered From Lima Works

Lima, Ohio

• • • Orders for 20 more locomotives, bringing unfilled orders to a total of 173, have been announced by the Lima Locomotive Works, Inc. The Southern Pacific Co. has ordered 10 additional big passenger oil burner locomotives, with 80-in. driving wheels and a loaded weight of 868,000 lb. each. The other 10 freight engines are for Richmond, Fredericksburg & Potomac Railroad and will have 69-in. drivers and loaded weights of 793,000 lb. each. The value of the 20-locomotive order is in the vicinity of \$4,000,000.

T.C.I. Announces New Mine and Coke Ovens

Birmingham

• • • • Plans for augmenting the coal mining and coking facilities of the Tenneseee Coal, Iron and Railroad Co., Birmingham, were announced March 14, by Robert Gregg, president.

An additional coal mine will be opened in the Pratt Seam at a point between Ensley and Port

Birmingham.

A new battery of 73 by-product coke ovens will be constructed at the by-product coke department of Fairfield Steel Works. Orders for the coke ovens are now being placed. They will be duplicates of those already in operation at Fairfield.

The coal mine will be reached through a slope equipped with a belt conveyor.

Sheet & Tube to Expand Special Steel Output

Youngstown

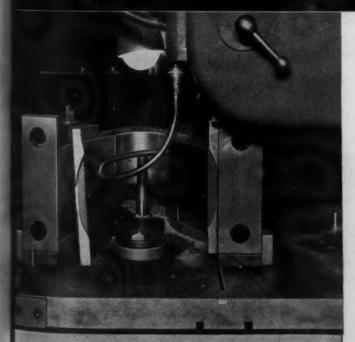
• • • Substantial improvements are being made at Youngstown Sheet & Tube Company's Brier Hill Works to increase production of special steels required by the government, according to the latest annual report. Similar facilities will be added to the 14-in. bar mill at the Indiana Harbor Works, while electrolytic tinning and bonderizing equipment is also being installed.

The company expects its 1942 earnings to be substantially below the \$16,124,400 net profit reported in 1941.

86-THE IRON AGE, March 19, 1942

OALL SPEEDS PRODUCTION





DoAll Contour Sawing BAND SAWING BAND FILING BAND POLISHING

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Fastest Precision Method of Removing Metal NEW
Interesting and
Valuable book
"Do All on
Production" free
on request.

7 HOURS' WORK IN 1 HOUR

At Filer & Stowell Co., Milwaukee, Wis., this Connecting Rod formerly took 7 hours to machine by boring and slotting. Now DoAll does the same work in 1 hour, and the slotter and boring mill are released for other work.

The DoAll sets new production records. Takes the place of shaper, milling and lathe work on hundreds of operations. Priced from \$1,000 to \$5,000 complete with necessary equipment. Worth its weight in gold — Investigate the DoAll at once.

Let us send a factory-trained man to your plant with a DoAll to show you what it can do and save for you.

CONTINENTAL MACHINES, INC.

1311 S. Washington Ave., Minneapolis, Minn.

Associated with the DoAll Company, Des Plaines, Ill., Manufacturers of Band Saws and Band Files for DoAll Contour Machines

IS A POTENTIAL WEAPON OF WAR

- Millions of tons more steel for ships, tanks, guns and shells can be made in this crucial year if more scrap becomes available.
- Can you answer "Yes" to Donald M. Nelson's question addressed to the nation:
- "Are you doing everything in your power today to put more weapons into the hands of our fighting men?"
- The scrap industry is committed to an all-out effort to prepare and ship all the scrap it can find.
- But it must have the further aid of metal-working plants, individuals and all producers of scrap to supply the extraordinary demand created by our stupendous war program. Government agencies are cooperating splendidly, but industry must do the bulk of the job.
- The need is so pressing that we urge the appointment of a salvage committee in every industrial plant to determine by careful survey what old equipment or material can be scrapped to aid in making our implements of war.
- Your local dealer will be glad to help whether the quantity be large or small.

The CHARLES DREIFUS

Company

(Broker in Iron and Steel Scrap for 40 years)

Philadelphia, Pa. Widener Bldg. Rittenhouse 7750 Pittsburgh, Pa. Oliver Bldg. Atlantic 1856

Worcester, Mass. Park Bldg. Worcester 6-2535

Age Limits Rise Above 60 for Skilled Men At Buffalo

Buffalo

• • • Steel plants and other war industries here have relaxed their age limits for skilled workers in good physical condition due to the rapidly-increasing need for mechanics. Skilled men more than 60 years old now are able to obtain jobs in defense plants. Workers without special training still find it difficult to obtain employment, however.

One local aircraft plant reported it recently hired a man 76 years old because of his skill in machine shop practice while another plane firm said it has a 77-year-old surveyor employed preparing manuals on shop practice for younger men. These are not isolated instances, it was said. Even aged men who are deaf are getting jobs in some plants as boilermakers.

"We could provide jobs today for 2000 skilled men past 60 years of age if they are in good physical condition," said District Superintendent Leo A. Sweeney of the Buffalo office, U. S. Employment Service.

Progress Program Interest Reported at High Mark

Cleveland

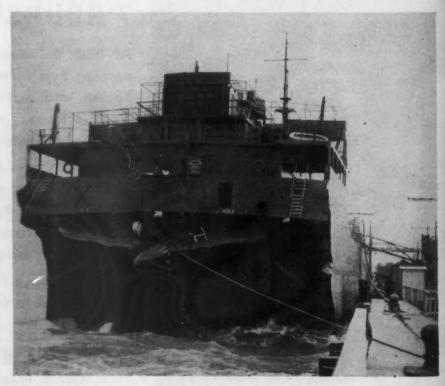
shown in the present \$200,000 Progress Program being sponsored by the James F. Lincoln Arc Welding Foundation than in the program of 1937-38, it was announced recently by officials. A number of papers have already been received, and the total number of requests for copies of the rules and regulations has already exceeded the former program by approximately 50 per cent. The Progress Program closes June 1.

Wayne Foundry, Detroit, Will Add to Facilities

• • • The Wayne Foundry Co., Detroit, has purchased the building and adjoining property at the southeast corner of Michigan and Hubbard avenues, Detroit, and will remodel the existing 12,000-ft. building for a non-ferrous plant. Considerable new equipment has already been purchased and it is expected to have this plant in operation within 60 days.

HALF SHIP SAVED: This American tanker, the E. H. Blum, arrived at Norfolk, Va., for repairs after its stern was damaged at sea. Water tight bulkheads saved the ship when it broke into two parts.

AP Photo



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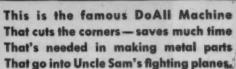
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DoAll and the THUNDERBOLT

Views on this page are taken at one of the Republic Aviation Corporation's plants, where the sensational new Thunderbolt is being made. Dozens of DoAlls are sounding the all-clear-ahead signal by shaping and finishing parts in a fraction of former time.

Every plant where man-hour and man-energy savings are essential needs the DoAll. Every metal worker instantly recognizes the value of this modern production tool.

DoAlls range in price from \$1,000 to \$5,000 complete with necessary

equipment; yet are relieving \$10,000 to \$50,000 machine tools of over-load work with valuable savings of time and metal.

* Fastest Precision
Method of
Removing Metal

Let us send a factory-trained man to your plant with a DoAll to show you what it can do and save for you.

NEW — Interesting and valuable book "DoAll on Production" free on request.



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AVIATION manufacturing speed-up without sacrifice of precision. For proper rolling contact of gear teeth in these magneto mounting drive gears. the correct backlash is maintained by Laminum shim. Simply peels for adjustment. Saves 30% and more in factory assembly or servicing time. Accuracy otherwise possible only by tedious, expensive methods! • Shims (.002 or .003 in. thick laminations) cut to your order. Stock shim materials for repair and maintenance obtainable from mill supply dealers.

Laminated Shim Company

76 Union St. Glenbrook, Conn.

Write for file-folder of shim application photos—and Laminum sample.



Schoeffler New Head of Cincinnati Trades Group

Cincinnati

• • • Officers were elected by the Cincinnati Branch, National Metal Trades Association, at a recent meeting at which leaders stressed the need for round-the-clock operations for production of war equipment. Fred Schoeffler, Lodge & Shipley Machine Tool Co., was elected president. Other officers are: Erwin Marx, G. A. Gray Co., vice-president; John B. Morris, Morris Machine Tool Co., secretary; Charles E. Gilbert, Cincinnati-Gilbert Machine Tool Co., treasurer. Members of the executive committee are R. E. King, Sanford M. Brooks, H. Calmer Uihlein. Advisory Committee members are Leroy Brooks, Jr., P. O. Geier, E. B. Hausfeld, R. E. LeBlond, E. A. LeBlond, E. A. Muller, B. B. Quillen, G. A. Seyler, A. H. Tuechter, and Paul W. Christensen.

New York to Have Free Powder Metallurgy Course

• • • • W. J. Baeza will give a course in powder metallurgy early in April at the College of the City of New York, under the direction of Engineering, Science and Defense Management Training. No tuition or other fees will be required for the course, which is to run for ten weeks, two nights a

Lack of Steel Cuts Car Firm's Profits

Pittsburgh

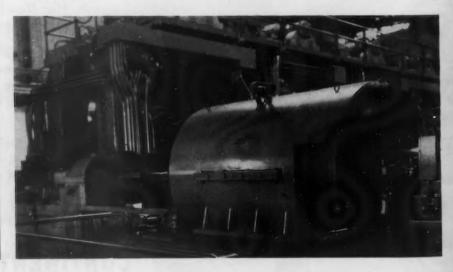
• • • Pressed Steel Car Co., Inc., and subsidiaries report for the year 1941 net profit of \$812,528, compared with \$1,526,970 in 1940. According to J. F. MacEnulty, president, the low profit in 1941 compared with 1940 was due in large measure to lack of material supply, mainly steel. Production at the McKees Rocks plant was only about 40 per cent of capacity.

Thompson Products Reports '41 Sales At \$40 Million

Cleveland

• • • Thompson Products, Inc., has been particularly fortunate in that its "war time products are substantially the same as those which are normally manufactured," according to president F. C. Crawford in the company's 1941 annual report. Record sales of \$40,000,-000 were witnessed during the year and record net income before Federal taxes amounted to \$5,010,183. However, taxes of \$3,287,495 reduced net income to \$1,722,688. The latter is only a modest gain over the \$1.670.844 earned in 1940. The company expects operations at its Thompson Aircraft Products Co. subsidiary to reach a peak of \$2,500,000 monthly and return a profit for 1942.

TO ROLL INTERMEDIATE gage e ameling and galvanizing sheets an installation of a 54-in. four-stand tandem cold reduction strip mill has been made at a southern Ohio plant. The mill is laid out for normal operation at speeds up to about 2100 fpm. maximum. In trial runs it has operated about 2400 fpm. Pictured is the Westinghouse 600 hp. 200/700 rpm., 750 volt d.c. motor driving tension winding and reel of this 54-in. mill. The motor is designed to permit rapid acceleration without excessive variation in tension.



Sixteen To One—A Challenge To America's Industry

(Rapid conversion of American industry to war production is a job which rests chiefly on the shoulders of the nation's engineers, J. H. Van Deventer, president and editor of THE IRON AGE, said March 17 in an address to the Engineers' Club of Dayton, Ohio.)

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• • • Times have changed considerably since I last had the pleasure of appearing before the engineers and industrialists of this city. That was about two years ago when everybody was saying "This is a 'phony war'." When all was quiet on the Western Front and when the automobile industry was making automobiles. Five million of them a year.

If I had told you then that in two years you would not have been able to buy a new tire or even to have an old one retreaded; that passenger car production would be out for the duration, and that most of you gentlemen would be in the aircraft or the munitions business, you would have thought that I had something wrong in my upper story!

I did not tell you then that this would come to pass because I never dreamed that it would, but seeing is believing. And it all goes to prove how little we know of what is likely to happen to us and to our work in these terrific and cyclonic times.

Gentlemen, you are no longer living in Dayton, Ohio. Metaphorically you and all the rest of us have moved so to speak to the cyclone country. The country where the farmers have to take daily inventory of their houses and barns, their livestocks and their wives and children in order to find out how many and how much have been blown away by the twisters during the past twenty-four hours. And that reminds me of a story.

There was once a settler in the great plains country who came from the East and who had therefore had no previous experience with twisters, and one of his hobbies was fences. The house and the barn didn't matter so much

with him but the fences were his pride and joy. So with much labor he built himself a beautiful fence.

Suddenly one day in the Western sky there appeared a little cloud no bigger than the palm of your hand. But it grew and grew, coming fast toward the settler's farm and as it came nearer he could see that it was a funnel shaped affair with the spout of the funnel dragging on the ground. On it came faster and faster, here it was—zip—and there it went—zoom—and with it went all of the farmers' new fence, not to mention half a dozen cows, a flock of chickens and his wife and mother-in-law.

Now the farmer could reconcile himself to the loss of the livestock and personnel but the loss of the fence was just a bit too much. So he determined to build a masonary fence six feet high and six feet thick of square cross-section. "Then," said he, "if some damn cyclone comes along and blows it over it will still be as high as it ever was!"

Well, gentlemen that is the task that we have set about to do in America. To build a fence so high and so thick, a fence for defense and offense so strong and so solid, that no cyclone or hurricane coming either from East or West or North or South can even upset it, let alone demolish it. And today we have to build that fence in a hurry because we started with a ten-year handicap in meeting the Hitler hurricane and the Celestial cyclone. And we are right in the middle of both.

So today you are in the fence building business. And you've got to sweat some to get it built in time!

As I see it there are three kinds of fence builders. One of them is the chap who wants to make it so perfect that he spends the time in designing it and revising it and perfecting it and redesigning it with the result that he never gets it built. Then there is the "hurrah boys" type of fence builder who has to get up a torchlight procession and parade around the

block and make half a dozen speeches before he gets to work. And by the time he is through with these preliminaries, he is so out of breath that he cannot do any work at all. And then there is the third kind of fence builder. The guy who takes off his coat, rolls up his sleeves, takes a chew of tobacco and goes to work.

You engineers and production men in hitherto private industry—and let me tell you no industry is private any longer—are in that third class of fence builders. And it's what you can and will do now, not what you have done yesterday or expect to do tomorrow that counts.

What we all have to think about today is today. Not yesterday or tomorrow. Today is the only thing that counts.

There is a play in New York entitled "Life With Father." It has been running for some four years, and I think I can safely say that I am perhaps the sole New Yorker who has had the price of admission and who hasn't seen it.

The reason that I have'nt seen it is because I believe that the life with father is passe. Father had his day and if he had done with that day what he should have done we would not be in the mess that we are in now.

Father was one of those fellows who went out to make the world safe for the Democrats. All that I have to say is that he did a pretty good job according to his lights, seeing as how at least this part of the world has been safely democratic for the past ten years.

The reason I have not gone to see "Life With Father" is that I do not believe there is any percentage now in looking backwards. There may have been in normal times, but not today.

By the same token I do not think there is any percentage in looking too far forward just at this time. It is true that there are some people whom I could mention who make a living, and a pretty good one at that, by gazing into the crystal ball and telling you what they see therein. But I would like to bet a dollar or two that two years from now if you check up any of these professional prognosticators as to what they have now said and predicted you will discover that you could have had

as satisfactory a monies' worth by consulting Madam Ohma, the gypsy queen.

Now most speakers, my friends, like to tell you either about the lessons of the past or the portents of the future. And here I am cutting away from under my rhetorical feet the past and the future, which leaves me only the present to stand upon.

Well, that's enough for any man. Maybe a little too much in fact. Certainly today means a lot to all of us if we take Donald Nelson's word for it that "an ounce of production today is worth a pound next year." And that according to my arithmetic is a sixteen to one ratio.

If you take this to be a fact, and I do, because I believe Mr. Nelson knows what he is talking about, then whatever you boys can ac-

complish today is worth sixteen times as much as what you might be able to accomplish in March, 1943.

I think this sixteen to one ratio puts a little different light on some of the previous normal activities of the engineering profession, especially as these relate to design and redesign. For if one ounce of production today is worth sixteen ounces a year from now, a new design would have to be sixteen times as good as the old one to warrant our spending our present time upon it providing that it would take a year to put this new design into production. That is something for us to think about. It would apparently restrict present day design and redesign to such activities only as could be almost immediately translated into time saved in production.

And that is one of the reasons why for some time to come, there will be no more gigantic new war munition plants built in this country. The thing that we have to do is to get all that we can out of the ones that are already built.

By the same token according to the sixteen to one ratio, if you engineers can, for example, now reduce by five per cent the time required to make a certain part of an essential product, it will be as great an accomplishment in the public interest, as if you were able to reduce that time eighty per cent a year from now. Paste that sixteen to one ratio in your hats!

Minutes count. Especially the present day minutes and the minutes that you have already spent. And that brings up the subject of salvage.

One ounce of aluminum or steel or copper or brass reclaimed from the scrap pile or kept from going into it now is worth a pound of similar metal in 1943. But there is more to it than that if the salvaged part has been worked upon. Because when you throw on the scrap pile a part that has been worked upon you are not only throwing away material but you are throwing away the minutes or hours of labor that have been put into it. You are making some man retrace his footsteps; you are causing a retreat behind the lines and that is something we haven't time for today.

I recently called attention to the fact, that a great deal of precious time that has been put into so called "spoiled parts," could be reclaimed were it not for the unnecessary rigidity of munitions specifications. And to the lack of initiative allowed in Government inspection.

As you gentlemen well know, there has been a great advance in the art of reclaiming undersized parts during the last twenty years. And a great advance in the art of filling in surface defects with weld metal.

I am afraid that many of our munitions specifications are based upon shop practice of twenty years ago and do not take cognizance of these developments.

Under our present system of munitions part inspections and specification, if a bore is too large or a spindle diameter too small, the one or the ten thousand pieces

AUTO MACHINERY PUSHED OUT: Auto companies are piling up unused production equipment under the skies in their rapid conversion to war production. This photograph illustrates something of the disorganization that is being created as plants are cleared to prepare them for output of new products, replacing passenger cars and trucks. Here presses, dies, benches, parts of conveyors and other miscellaneous equipment stands in snow-covered parking lots and yards. It is estimated that the equipment now outdoors alongside this Chevrolet plant where this photo was taken represents less than 5 per cent of the machinery which Chevrolet will eventually store outdoors. It is covered with a light coating of grease, wrapped in weather resistant paper as rapidly as possible. Every month or so it will be necessary to remove and replace this grease to keep the equipment in reasonable shape for post-war automotive production. Since this photograph was taken hundreds of pieces of equipment have been stored in adjoining fields.



90B-THE IRON AGE, March 19, 1942

affected are thrown summarily on the scrap heap together with the labor that has gone into them and the precious time that it took to make them. In private industry, these parts would be built up to the required diameters by a simple process such as metal spraying and the hours of labor and the pounds of material involved would thereby be salvaged before getting to the scrap pile.

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By adopting the same procedure in our munition work many hundreds of thousands of wasted hours could be saved. And each hour, on a sixteen to one ratio is worth two days of work one year from now!

Watch out for this great opportunity to be of service. If you find these things getting by, call them to the attention of the management. If you can't get satisfaction from the local government inspectors in situations which should be remedied, call this to the attention of General Bill Knudsen. You will get action from him because he knows what salvage means.

In this battle to save time, don't forget that the seconds count. Suppose that each of the twenty-four million workers in our industrial occupations, for example, could save but ten seconds a day apiece. I do not think that there is a man in this country who could not save ten seconds a day if he made up his mind to do it. Why ten seconds a day saved by each of these workers would amount to sixty-six thousand hours, which would be equivalent to adding about eight thousand additional workers. And on our sixteen to one ratio eight thousand additional workers today producing what we need would be equal to what one hundred and twenty-eight thousand workers could produce a year from now.

Perhaps some of you are inclined to doubt Donald Nelson's sixteen to one ratio. Well let's look at General Douglas McArthur, who is putting up the greatest fight that any American has made since George Washington. Don't you think, that one heavy bomber put into his hands today would be worth sixteen of them a year from now?

Production! Production! Production! We started ten years late to build that stone fence, but by all that's holy, the engineers and

production men of America are going to build it and build it now.

It's not going to be said of the engineers of America, upon whose shoulders the responsibility for production rests, that we let Mc-Arthur down. If we did that, we would not want to face our children or our grandchildren.

I have an abiding faith in the engineers of America. Maybe because I am one of them and you have to have faith in what you are and what you do.

If I thought that we engineers of America were not going to be able to measure up to the task in front of us; if I thought for one moment that we could not outengineer and outproduce Hitler and Hirohito, I would throw my M.E. degree from Cornell in the ashcan and join the Salvation Army.

We started ten years late. But we can catch up if each and every one of us will do steady pumping. And that reminds me of a story.

It is a story that may explain how Germany and Japan got the jump on us.

We in this country prided ourselves, for example, on our ability to produce automobiles and radios and refrigerators, millions and millions of them. And we pitied Germany and Japan and felt superior to them because in those countries the people had to walk or to goose step, or to take the buses or the jinrickshas. They couldn't turn out motor cars as we could!

Boys, don't fool yourselves. Any nation that could turn out airplanes and tanks and guns to the tune that Germany and Japan have turned them out could have made automobiles if it had wanted to.

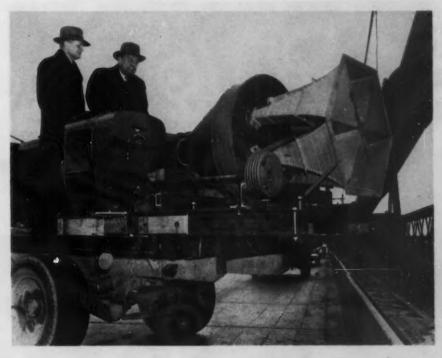
They did not care particularly to make it possible for their people to ride because they wanted later on to be able to make us run. And by golly, they are doing it. While we were busy raising the standard of living in this country and providing luxuries, Germany and Japan were busy going without things and raising the standard of dying. They were steady pumpers. And that brings me back to my story.

Once upon a time there were two communities, each of which resolved to install a fire protection system. One of them bought a little pump, but erected a large standpipe. The other bought a big pump but no standpipe.

The first community did not wait for the fire. It kept its little pump running night and day, building up a head in the standpipe. The

NEW YORK AIR-RAID SIREN: E. Wente of the Bell Laboratories and Irving Huie, Commissioner of Public Works, are inspecting this new air raid siren in New York City. The siren test was pronounced a success.

International News Photo



THE IRON AGE, March 19, 1942-90C

the basic material in war. Can

Some people who know that our

you imagine war without it?

second community, with its big pump, waited until the fire broke out. And then it learned to its dismay that "little and often" is better than big and sudden.

Because they were willing to do away with the use of things that we here considered essential; because they were willing to walk or goosestep or take the bus instead of stepping into sedans or limousines or coupes, Germany and Japan had built up a head in the standpipe over the past ten years that we have to overcome in the next two.

Can we do it? If I did not think that we could and would, I would be tempted to open the window of my office in the Pershing Square Building in New York and jump out of it.

I am not going to do that because I firmly believe that you engineers and production executives are going to make good in this matter of conversion.

After all is said and done, there are two things that count. They are what you've got to do with and what you do with what you've got. Take steel for example, Steel is

de and often" is capacity for producing steel is nine or ten times of that of Japan are rather amazed to hear Mr. Nelse of things that son and his associates beg us to

son and his associates beg us to hurry, hurry, hurry. But don't forget the standpipe.

Japan has been buying and hoarding our scrap for ten years under the good neighbor policy of handing it back to us with interest as at Pearl Harbor.

Japan has to do what she has set out to do in a hurry.

With her accumulated and hoarded scrap, and her accumulated reservoirs of munitions, Japan can exceed our rate of conversion of steel into warfare. That gives her the edge now. Later on she will not have it. But later on may be too late if we do too little now. And that's why an ounce of steel or an hour of labor is worth sixteen times what it will be a year from now.

Some of you gentlemen, like myself, may have sons in the Army or the Navy who will be personal recipients of this scrap iron that Japan is now spending so freely. And I think that it is up to us to give the senders who are shooting it our way an I.O.U. for it and return it to them with compound interest.

Conversion. That's the big word today. Automobile plants being converted into tank plants and gun plants. Cash register plants ringing up the seconds on time fuses instead of the nickels of customers. Where do you engineers get off on that?

Well, the big boys with the brass hats at the top are the ones who say what shall be converted to which. And they, in turn, are following the orders of the bigger brass hats in Washington. But when all is said and done, the boys who do the converting are not the brass hats of your company, or the bigger brass hats in Washington, but you fellows like myself who are not conversant with Latin or Greek, but who know how to follow and to read a blue print.

We may not know much about the art of rhythmic dancing or strip-teasing or reciting poetry during a blackout, but when it comes to getting things done we are the boys they turn to. And we will not let them down.

America can depend upon its engineers and production men. We have the greatest responsibility of any professional group in this country. And I will stake my life that we will make good at it.

I am not here tonight to compliment you upon your present achievements. Or to congratulate you upon the things that you have already done. Or to dilate upon the tanks and airplanes and guns that will soon be pouring from our factories. I am here to tell you to forget the past, neglect the future and live and work for the present. Live every day for what you can do that day. And try to make it just a little bit more than yesterday. Remember what ten seconds mean.

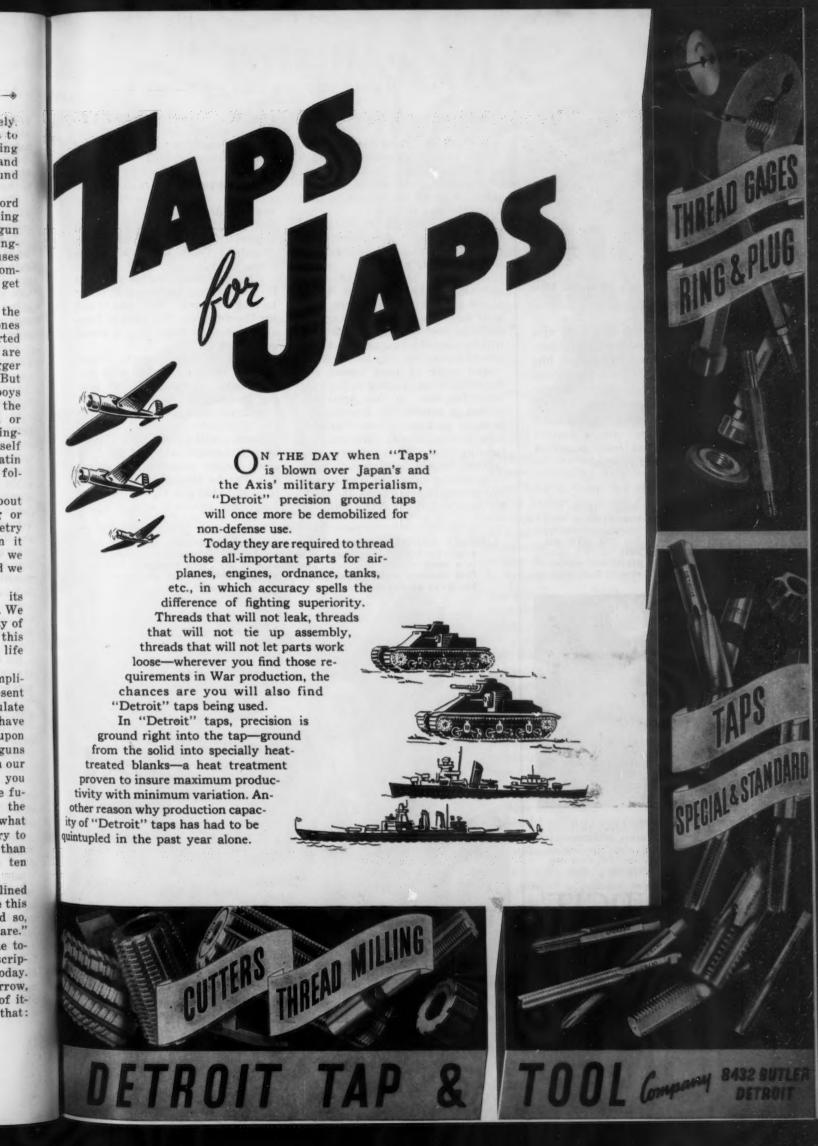
Some of us I think are inclined to say: "If so and so had done this and that instead of thus and so, things would not be as they are."

Gentlemen, there is no time today for post mortems. The scripture applies to the situation today. "Take no thought for tomorrow, for tomorrow will take care of itself." And I can add to that:

HUDSON BUILDS PLANE PARTS: The first indication that production is underway at Hudson Motor Car Co., on rear fuselage sections for the Martin B-26-B bombers is this photo. Here, Col. Carlisle H. Ridenour, U. S. Army Air Corps, is inspecting a fuselage in an assembly jig with R. F. Stoneking, assistant superintendent of Hudson's aircraft division; L. F. Hobson, Hudson representative; R. J. Morris, air plant protection officer; Capt. W. R. Godard, Air Corps resident representative; and C. D. Sterling, secretary, Hudson Motor Car Co.



90D-THE IRON AGE, March 19, 1942



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"Give us the tools... and we will finish the job."

Men do their best work with the finest tools and equipment.

Whenever a worker lifts heavy parts in a production line (or elsewhere) a 'Budgit' Hoist relieves him. The results are greater production at less cost and a happier worker free from danger of strain and rupture.



'Budgit' Hoists cost from \$119. up with lifting capacities of 250, 500, 1000 and 2000 lbs. For complete information write for Bulletin 348.



Send for catalog containing complete information on Hoists, also, "Time Saving Calculator" that shows savings they earn.



'BUDGIT'

MANNING, MAXWELL & MOORE, INC. MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves. Consolidated Safety and Relief Valves and 'American' commercial instruments. "forget yesterday because it is gone forever."

We cannot afford today to live in the past or to worry too much about the future. And some of you boys may be worrying about what is going to happen to you after the war is over.

Again I will quote the scripture: "Sufficient unto the day is the evil thereof." And believe me, today is plenty evil.

As far as engineers are concerned you have less to worry about concerning the future than most other people. Engineering and medicine are two professions that will be needed no matter what system of enterprise may be in effect.

And some of your bosses are worrying what is going to happen, after the war, to the American system of enterprise. I would say to them, as I say to you, that will take care of itself. We are not fighting this war to preserve our system; we are fighting it to keep from having either the Nazi or the Jap system imposed upon us. After we have licked the Nazis and the

Japs, will be time to chart the future course of American economics and social relations. And I have enough confidence in the common sense of the average American to be willing to live and work in whatever system that average American shall choose.

As long as it is an American system and not a Nazi or a Jap system, I think that we can go along with it.

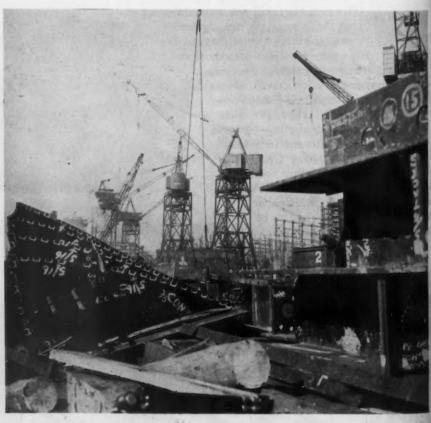
As engineers, we have been trained to look backward in order to look forward. But that is out for the duration. The kind of foresight we need today is not based on hindsight.

If you want an example of that kind of thinking, I will cite you Singapore. Hindsight spent four hundred million dollars in fortifying three sides of it and left the fourth undefended.

More, I will cite you Pearl Harbor. Hindsight said that the Japs could never successfully attack this Pacific stronghold of America. But they did. One of our own American admirals said that he

LIBERTY SHIPS: Here are prefabricated tanks and deck girder section ready for installation in one of the new Liberty ships under construction in a large eastern shipyard. The ship parts are prefabricated in a plant that formerly built freight cars and the completed sections are shipped to the ways on flat cars.

O. E. M. Photo



EXCLUSIVE AJAX Rear Extension Quided Ram

assures accurate die alignment in multi-stage press forging...

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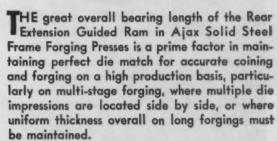
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Due to the great guided length, the ram remains accurately aligned despite the tremendous offcenter pressures developed in multi-stage forging, where die impressions are considerably offset from the ram center line. Tongued-in front cover plates, bronze guide plates, both sidewise and front and back, with convenient adjustment to compensate for wear, provide for maintaining this accurate alignment throughout years of productive service. The resulting accurate die match and rigidity hold the forgings to such close tolerances that considerable time and metal are saved in machining operations.

The rear extension slide construction . . . exclusive in Ajax Solid Steel Frame Forging Presses . . . makes the entire pitman assembly completely accessible for inspection, adjustment or disassembly without removing the ram or its cover plates.

Excellent die match, accessibility of the pitman and ease of adjustment made possible by the Ajax Rear Extension Guided Ram, serve to emphasize the wisdom of purchasing forging machinery on the basis of mechanical soundness.

> BUY FORGING EQUIPMENT ON THE BASIS OF MECHANICAL SOUNDNESS



THE AJA MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND, OHIO

621 MARQUETTE BUILDING COMPANY

would clean up Japan as a morning's work and be back for lunch. But he didn't.

I think that there is a lesson in this for us engineers whose profession has been largely based heretofore upon hindsight. We have inherited geometry from Euclid, algebra from India and arithmetic from China. We have earned our degrees through the study of textbooks written by men who are dead and gone.

But, friends, all of this that we have in the way of conventional and established knowledge is as available to our enemies as it is to ourselves and to our allies. They, too, can buy textbooks. What we need is what they have not got. And it is up to you to get it.

I am not speaking now of some mysterious death ray machine such as might have been conceived in the imagination of an E. Phillips Oppenheim or an H. G. Wells, No indeed. If you go down that sidetrack you will never reach your destination. I cannot very well dramatize what we need from you because it is so simple.

What America needs from you now is just a little more production. Not a great deal morenothing spectacular in the way of a new process or a new invention. Not a new cannon that will shoot a hundred miles, or a new airplane that will fly at six hundred miles an hour. Some day, yes; but that is not what counts today. The thing that is going to win this war for us, that is going to help and justify the valiant McArthur in Bataan: that is going to put a deadly crimp in the over-expanded supply lines of Japan is not some new and sensational improvisation; it is just a little bit more today and tomorrow from our factories-just a little bit gentlemen. but what a lot that little bit may and will be!

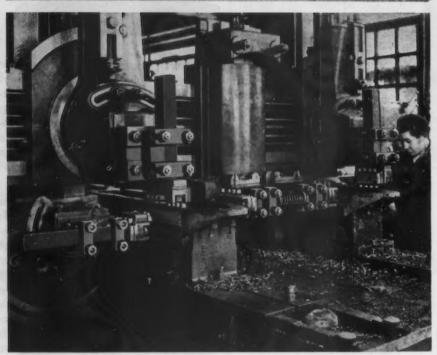
Some of you as I said, like myself, may have sons in the service. I know that you, as I do, feel our tremendous responsibility to them.

But being older, with the skill, training and experience that years have brought us, we can at least hold up their hands. It is our task to see that these sons of ours are equipped to meet the enemy on equal terms. That is all that they ask from us. And is that too much?

These boys of ours, the upstanding youth of America, are going cheerfully abroad to fight for their homes and firesides. There will be no complaints upon their lips, if like Colin Kelly they die for their country. They will not indict us then with "too little and too late." But, gentlemen, how can we, of American industry, who are responsible for production, live with ourselves and face the future unashamed if because of us it is too little and too late?

That is the tremendous responsibility that rests principally upon the shoulders of the engineers and production men of American industry. We are the ones who must arm these boys fully and adequately to meet the foe.

We are the ones to whom they look for just an equal man to man chance to show what Americans can do. Shall we make good to them? God help us, we will!



REMOVING TWICE THE METAL with 1/10th the high speed steel

Everyone is concerned about high speed steel, for the demand is the greatest in history while the supply is becoming harder to maintain. To squander high speed steel in heavy forged tools today is prodigal, for there is no standard operation on lathes, planers, slotters or shapers that cannot be done better, faster, cheaper and more efficiently with the right ARMSTRONG TOOL HOLDER. Take the planer job illustrated above. These ARMSTRONG Gang Planer Tools require only small cutter-bits of high speed steel, require but a small fraction of the high speed steel to do this operation that would be needed if this job were tooled with six cumbersome forged planer tools. The saving of high speed steel on this single set-up alone figures in hundreds of pounds. These ARMSTRONG TOOL HOLDERS not only Saved: All Forging, 70% Grinding and 90% High Speed Steel, but, because of their greater efficiency, doubled the area surfaced with each travel of the planer bed (as compared with the area that would be surfaced with 6 single point forged tools). You can end delays for tooling-up, can increase both speeds and feeds, can cut cutting costs to a fraction and make every onne of valuable high speed steel do the work of 10 ounces by standardizing on ARMSTRONG TOOL HOLDERS. The "Armstrong System" provides tool holders in over 100 sizes and shapes. They are stocked by all leading supply houses. Write for Catalog C-39.

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FOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool I

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they man icans od to Meetings April 24 On J. & L.-Otis Deal

• • • More light was shed last week on the proposal whereby Jones & Laughlin Steel Corp. would acquire Otis Steel Co. and thus add 1,000,000 net tons of ingot capacity annually.

E. J. Kulas, Otis president, revealed March 11 a plan of sale and liquidation which Otis shareholders will consider April 24. The plan proposes that the holders of shares of convertible first preferred stock of Otis will receive for each share:

for each share:

1—One-quarter share of the 5 per cent cumulative preferred stock, Series A (\$100 par), of Jones & Laughlin, and 2—One-quarter share of the 5 per cent cumulative preferred stock, Series B, convertible (\$100 par), of Jones & Laughlin, which is convertible into common stock of Jones & Laughlin at the rate of three shares of common stock for each full share of such Series B stock, and

3—One share of common stock (without par value) of Jones & Laughlin, and 4—Payment in cash by Otis of the accrued unpaid dividends on its preferred stock. Such accruals will amount to \$6.875 a share on March 14, 1942, after the payment of a dividend of \$2.75 a share which has been declared for payment on that date.

Holders of shares of common stock of Otis will receive for each such share:

1—One-quarter share of common stock of Jones & Laughlin, and

—\$1 in cash.

Meanwhile, H. E. Lewis, presi-

Meanwhile, H. E. Lewis, president of J. & L., in a letter to stockholders revealed a contract for the purchase of Otis, subject to approval of J. & L. stockholders April 24.

COMING EVENTS

March 26 to 28—American Society of Tool Engineers, annual meeting, Hotel Jefferson, St. Louis.

April 14 to 17—Packaging Exposition and Conference, Hotel Astor, New York

April 15 to 17—Open Hearth Con-ference, Cincinnati. April 15 to 18—The Electrochemical

Society, spring convention, Nash-

Society, spring convention, Nashville, Tenn.
April 18 to 24—Foundry and Allied Industries Show, Cleveland.
April 20 to 24—American Foundrymen's Association, Cleveland.
April 27 to May I—American Mining Congress, Coal Show, Cincinnati.
May 11 to 13—American Gear Manufacturers Association, 24th annual

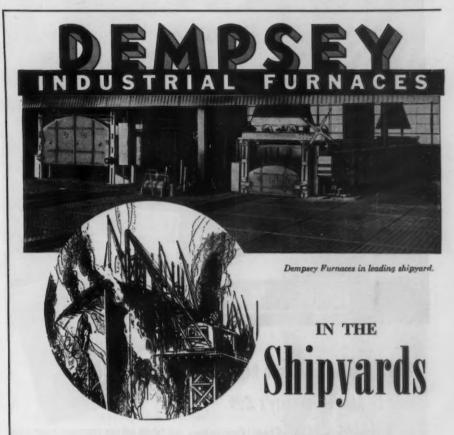
ufacturers Association 26th annual convention, Hershey, Pa.
May 25 to 28—National Association

of Purchasing Agents Convention,
Waldorf-Astoria Hotel, New York.
June 21 to 25 — American Water
Works Association, Chicago.
Aug. 23 to 30—National Association

of Power Engineers, New Orleans. Sept. 1 to 11—Building and Con-struction Trades Council, Atlantic City, N. J.

Under terms of the contract J. & L. would acquire the business, property and practically all the assets of Otis and assume all its liabilities, including \$13,063,000 of outstanding 4½ per cent first mortgage bonds, due 1962. J. & L. will issue to Otis 34,293 shares of its 5 per cent Series A preferred stock; 34,293 shares of 5 per cent convertible Series B preferred stock; 366,306 shares of no par common stock; and the sum of \$916,536 in cash. Securities and cash will be distributed to Otis stockholders under the Otis plan of distribution.

Mr. Lewis said it was contemplated Mr. Kulas would be elected a director of J. & L. and vice chairman of the executive committee and be associated in the active management of the company.



We point with pride to DEMPSEY'S contribution to "Bridging the Seas"

HIPS...ships...and more ships! Warships, cargo vessels and tankers. The din of this mighty program is a tribute to America's willingness and ability to meet a challenge. In many of the leading shipyards, Dempsey Furnaces are performing yoeman service. Dempsey is meeting shipbuilding's exacting requirements with the same dependability that has characterized Dempsey Furnaces for more than twenty-five years. Dempsey installations are tailored especially to meet your exact requirements, and include:

Recirculating Continuous Conveyor Bright Annealing

Clean Hardening Shell Forging and Nosing Cartridge Case Annealers

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Offers Combined 50 Years' Experience Building:
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OPA Freight Rote Government Affect

Washington

• • • For the most part OPA price schedules will be left unchanged as the result of increased railroad and motor carrier freight rates recently granted by the Interstate Commerce Commission which on Monday dismissed OPA's petition to postpone the effective date of the higher rates from March 18 to April 15.

Particular interest was shown with regard to the action OPA might take respecting the scrap schedule. The decision to leave shipping point prices unchanged. the only alternative possible in the absence of amending the schedule, will require consuming steel mills and foundries to absorb the increased rates. They also will be called upon to pay higher rates on other raw materials but not on ore or coke. In turn this means higher costs in the production of rolled steel and castings and consequently raises the question whether these producers will need relief by way of higher prices for their products whose chief buyer is the government.

The present pig iron and steel mill price schedules, also left unchanged, will result in absorption by consumers of the increased rates since added to delivered prices will be the increased freight rates. Furnaces and mills not located at basing points will have to absorb more freight to the extent of the increased rates between their producing points and the basing points on which their rates are made.

In the cases of scrap, steel and castings the freight rates increase granted was 6 per cent.

A different situation applies with respect to coke. Rates like those on bituminous coal, were increased 3c per net ton where the rate was \$1 or less and 5c when it exceeded \$1. Coke producers will absorb the increased rate, leaving existing OPA prices unchanged. OPA did not ask the ICC to hold up increased rates on coal and coke and the commission did not allow increased rates on iron ore.

Products for which OPA asked postponement of the effective date



for Information about Steel Castings

MANY industries feel the need for clear, concise information about steel castings. As part of the Lebanon program to provide such data, two "thumbnail encyclopedias" have been developed. Both are easy to keep handy . . . easy to use. Both have a definite place in the reference files of any user of steel castings.

LEBANON STEEL FOUNDRY . LEBANON, PENNA.

CARBON AND LOW STRUCTURAL ALLOYS REFER-ENCE CHART (upper) - Concise data on Lebanon Carbon and Low Structural Alloys. Specifications, analyses and physical properties are given. Also included are comparable classifications of U.S. Government, S.A.E. and A.S.T.M.

STAINLESS STEEL CASTINGS REFERENCE CHART (lower)-Covers Circle (Stainless, Corrosion Resistant and Heat Resistant Alloys . . . shows wrought and cast materials of comparable analyses. Designations, alloying elements, physical properties, heat treatment are covered.

Both charts are available to executives, engineers and metallurgists upon request.



LEBANON Stainless and Special alloy STEEL CASTINGS

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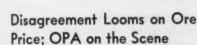
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of increased rates included ferrous and non-ferrous scrap, pig iron, copper ores, lead ore, copper and lead.

OPA last Friday made known for the first time that it would ask for postponement of the effective date of increased rates when Dexter M. Keezer of OPA addressed the railroad committee of twenty-one in New York. He declared the general freight rate increase an inflationary factor.



• • • • A formal meeting will be held in Washington at OPA within a week or 10 days with Lake iron ore producers in an effort to develop price ceilings. A preliminary conference of producers and OPA officials was held in Cleveland last Thursday. It is reported OPA is in disagreement with producers over the establishment of a price as high as the published base quotation of \$4.45.

Discounts Reinstated

Washington

••• An amendment to Price Schedule No. 6, iron and steel products, requires producers of bale tie wire to reinstate customary minimum discounts of 40c. per 100 lb. on their sales to manufacturers of bale ties. Recently some steel companies substantially reduced discounts.

Press Maker Aided

Washington

••• The Niagara Machine & Tool Works, Buffalo, on Monday was authorized by OPA to charge \$4,732 for its No. 59 single crank press, \$10,693 for its No. 612-G double



crank press, and \$2,600 for its No. 310 power squaring shear, by an amendment to Price Schedule No. 67. These prices in excess of its Oct. 1, 1941, list were allowed to be charged because OPA agreed that the company could not recover the costs of manufacture on these machines if it rigidly adhered to price as of Oct. 1, established by the ceiling.

The amendment also allows the company to submit before April 15,

the prices it proposes for other similar machine tools. OPA denied the company's request in the case of 36 other machines, claiming that Oct. 1 prices caused no hardship.



Correction on Soil Pipe

Washington

• • • Amendment No. 1 to Price Schedule No. 100, cast iron soil pipe and fittings, should be corrected at Section 1306.304 (b) to read April 1, 1942, and the effective date should be shown as March 7, 1942, OPA announced on Monday.



Ferrovanadium Unchanged

• • • Vanadium Corp. of America, New York, on March 13 reaffirmed, for second quarter, prices on all grades of ferrovanadium, vanadium pentoxide, ferrosilicon, ferrochromium, high and low grades; ferrotitanium, all grades, and alsifer. Outside of an increase last fall on chromium, the prices have been stable for some time.



Ferromanganese Action

• • • Ferromanganese prices have been extended unchanged to April 15, pending an OPA decision on price levels for the full second quarter, it was reported at New York early this week.



Export Prices Clarified

• • • To clear up misunderstandings on the application of maximum price regulations to export sales of certain metals, OPA said March 13 that the regulations apply to all sales of the particular commodities covered, whether domestic or for export, unless a specific exception is included. The fact that a particular regulation does not provide a margin for, or mention, export sales does not mean that such sales are not subject to its terms. Where such a situation prevails, the maximum prices established apply to export as well as to domestic sales, and export sales at prices in excess of those set forth are violations, and will be subject to all of the penalties provided.



Canada to Absorb Boost

Toronto

• • • Despite the fact most other steel producers in Canada have now followed the example of Algoma Steel Corp. Ltd., and raised prices of steel \$5 per ton, the Steel Co. of Canada Ltd., at the time of this writing, had made no change



TORRINGTON'S W-11 SPRING COILER

delivers 120 springs like these every minute!

— and what springs! Dimensionally UNI-FORM— in coil diameter, cutoff, length of extended end, spacing of coils, with ends cut off squarely without distortion, saving trimming operation. New precision at high production speeds. Torrington coilers also rapidly produce accurate extension and compression springs of all wire diameters between .003" and .500".

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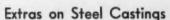
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other have f Alaised Steel ne of from old price lists. Officials of the company have no comment to make, other than that prices are unchanged.

It is learned now that the increase cannot be passed along to the public, but that provision has been made whereby the government, as a purchaser of finished steel war materials will absorb the difference. By not passing the increase along to the public the cost-of-living index will not be disturbed and will not affect the wage scale by those concerns that pay that bonus. (See story on Canadian wages, page 00.)

The advance in price by most other producers has not affected new business. Consumers are buying from any mill that is ready to make delivery irrespective of price.



• • • Railroad specialty producers, under Amendment No. 1 to Revised Price Schedule No. 41 (steel castings), are permitted to charge for certain extras, coupler repair parts and pattern costs which they customarily charged between Oct. 1 and 15, 1941, Acting Price Administrator John E. Hamm announced March 13. The amendment does not allow an additional charge for certain extras which were charged between Jan. 1, 1941, and May 14, 1941. Charges for these extras were suspended on the latter date.

The amendment also provides that maximum prices for coupler repair parts shall be the prices which customarily were being charged therefor between Oct. 1 and 15.

Copper Scrap Revision

• • • Railroad scrap which is reprocessed under conversion agreements approved by WPB is exempt from Revised Price Schedule No. 20 (copper and copper alloy scrap) according to an amendment March 14, retroactive to Feb. 27. The exception has no real effect upon scrap prices, and will operate to avoid any increase in the net cost of castings to the railroads. It is available only to foundries complying with a stabilization request on Jan. 30, 1942. It applies only

to the types of copper or copper alloy scrap which resulted from the use or machining of products into which the scrap in turn is melted.

Zinc Toll Agreements

• • • Toll agreements for the smelting of zinc concentrates, and changes in specifications of the

metal to be smelted, were subject to OPA review before they could be put into effect, under Price Schedule 81 as originally issued. Amendment No. 1 issued March 13 permits toll agreements and changes in specifications to be consummated without OPA sanction, but they are subject to OPA review and action at later date if agreements are found to be out of line.



PRP Revised to Permit Use of Other Rating Certificates

Washington

• • • • WPB has revised form PD-25A, the application form under the Production Requirements Plan (order P-90) to be used in filing priority applications for the second quarter of 1942. The changes

are largely technical, including requests for some additional information, and are designed to assist WPB in determining material requirements, thereby making the assignment of ratings more accurate.

AN ARMY TRAVELS ON ITS SUPPLY LINES

.. SO DOES PRODUCTION

• If a modern army is to attain any measure of success, it must have complete and fast-moving lines of supply backing it to the limit. Likewise, high speed machines turning out shells and guns, planes and tanks, must have supply lines to keep them producing. In America's great plants today where war materials are made, Mathews Conveyers are keeping parts and assemblies flowing to and from machines with speed and control. It's a Mathews job to keep vital material moving.

If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.



MATHEWS CONVEYER CO., ELLWOOD CITY, PENNA.

MATHEWS CONVEYERS FOR MECHANIZED PRODUCTION

Concurrently, an amendment to PRP was issued by WPB and incorporated in the revised form. By the amendment, a company operating under the plan is permitted to use ratings other than those assigned on PD-25A to obtain "as required" or "special order" materials not ordinarily carried in stock, without any special permission from WPB.

AA ratings may also be extended by any company without special permission, but any producer operating under the plan who makes use of the other ratings must report such use on Form PD-25g, at the end of each month. Reporting form PD-25g is now being printed and will be available in two or three weeks.

An important change in the form is that unfilled orders on the applicants books as well as past shipments are to be reported, and will be taken into consideration in the assignment of ratings for specific quantities of materials for which priority assistance is granted. Consideration has previously been given to unfilled orders when supplementary applications have been submitted for re-rating, rating on additional requirements, but not on the initial ratings to cover the whole quarter.

In addition to filing Form PD-25A, applicants for priority assistance must send an accompanying letter. If any of the materials requested is affected by a conservation or limitation order, the letter must include the following information concerning the use of these materials:

- (1) Part in which material is incorporated, product into which part enters, and the use of product in which material is incorporated, or purpose for which material is used.
- (2) Substitutions made to date, amount of material saved per month, further substitutions anticipated or reasons why no subsitutions can be made, including specifications number of Army or Navy.
- (3) Form, grade, type, or alloy of material.

In making use of the ratings assigned, a producer must make a separate purchase order for each rating used, even though both orders may be placed with the same supplier.

A revision of Form PD-25f, used

WPB Gets Court O.K. To Inspect Records

Washington

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• • • Authority of WPB agents to have access to the premises and records of a company affected by priority orders was upheld last week when a Federal judge in Chicago issued a permanent injunction requiring the Chicago Alloy Products Co. to permit audit and inspection by government agents and to refrain from disposing of its stocks of metals until the audit had been made.

The company was also perpetually enjoined from violating or further violating any regulations or orders issued by WPB. This provision of the injunction would subject officials of the company to penalties of contempt of court including possible jail sentences if they are found guilty of violating any priorities orders.

The request for the injunction was the first action of its kind to be taken by the government. The government's petition for the injunction alleged that the company was negotiating transactions in scarce metals without priority sanction and was selling its products at prices in excess of the maximum prices established by OPA.

to make appeals for higher ratings than those assigned on the basis of the original application, or appeals for greater quantities of materials needed because of new orders received, has been made. Printed copies of this form are not as yet available.

Companies which need interim assistance urgently may submit the information required by Form PD-25f by telegraph, or telephone, to the WPB Interim Assistance Section of the Production Requirements Branch, and receive telegraphic authorization, when justified, within 24 hr.

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Aircraft Ratings

• • • WPB last week abolished the rating distinction between material to be physically incorporated into aircraft products and other necessary materials used by companies producing military and naval aircraft, and lowered the

rating assigned trainer planes from A-1-a to A-1-b in amendment of order P-109.

The change in the order in connection with materials means that materials used indirectly as well as directly in the production of planes will henceforth have the same rating. Ratings assigned by the amended order can be applied to purchase orders previously

placed. All ratings are fully extendible.

Farm Machinery

• • • The WPB Farm Machinery and Equipment Branch has announced that all manufacturers of the types of farm machinery and equipment covered by limitation



STANLEY ELECTRIC TOOLS

A Complete Line for Industry

order L-26 are subject to the terms of that order, regardless of whether they have been able to obtain materials without the use of a preference rating.

The branch's statement was designed to clear up confusion which it said had arisen in the farm equipment industry over the relation between the limitation order and the accompanying preference rating order P-95, which makes an

A-3 rating available for materials going into the manufacture of specified equipment.

The branch said that it has been advised that some manufacturers who possessed large inventories of materials at the time the orders became effective or who have been able to buy materials through jobbers or other dealers without the use of a preference rating, have been ignoring the terms of

L-26. Order L-26 placed limits on the production of various types of equipment from Nov. 1, 1941, to Oct. 31, 1942.



Rhodium in Jewelry

• • • The need to conserve rhodium for coating reflectors in antiaircraft searchlights resulted in the issuance by WPB last week of order M-95 barring the use of the metal to finish jewelry. WPB authorized jewelers to use up their present stocks, which, however, must not be replenished.



Highway Machinery

• • • Highway contractors needing road machinery and equipment must make individual application in the future on form PD-1a instead of extending preference ratings assigned to road projects, according to an amendment to order P-19-e issued by WPB. However, the ratings assigned to road projects may be extended to obtain repair parts to prevent stoppages.



Warehouse Steel

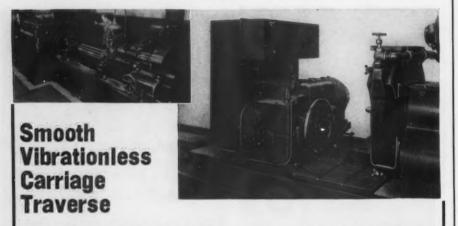
• • • Steel warehousemen in Birmingham are confident that priority form PD-83-g, pertaining to the extension of preference ratings higher than A-9 by steel suppliers to their sources of supply, will materially aid warehouses in maintaining better inventories. Before WPB made it possible for warehouses to extend ratings higher than A-9 in this simplified form, warehouse stocks here were heavily depleted in all-specifications. In the case of structurals and plates, there were practically none available on ratings lower than A-1-c.



Bicycle Production

• • • Bicycle makers will use 30,000 tons of steel less in the production of bicycles in 1942 than they did in 1941, WPB estimates, in announcing order L-52, curtailing the manufacture of bicycles, and ordering the production of "victory" wheels.

After April 1, according to the order, no bicycle may weigh more



Assures Roll Accuracy and Fine Finish in FARREL ROLL GRINDERS

A feature of the Farrel Heavy Duty Roll Grinder which contributes greatly to a continuous high output of rolls ground to uniform accuracy and fine finish is the smooth, positive traverse, steadiness of travel and the smoothly accurate reverse of the carriage carrying the grinding wheel.

Vibrationless traverse is achieved by driving the carriage by a reversing motor through accurately generated Farrel-Sykes continuous tooth herringbone gears and a worm reduction to a worm meshing with the rack on the bed. This is the smoothest type of mechanical drive known for machine tool carriages.

Reversal is accomplished electrically, eliminating mechanical clutches. A variable speed motor and a two-speed drive provide a wide, adjustable speed range for every grinding condition. Speed change and point of reversal are quickly and easily set at the operator's station. They are automatic and require no attention by the operator except adjustment to changing conditions as the work progresses.

Our Bulletin No. 111 describes this and the many other important features which contribute to the high output and superior performance of Farrel Heavy Duty Roll Grinders. We shall be glad to send a copy promptly on request, without obligation.



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to the more than 31 lb. and in general may contain no metals other than iron, unalloyed steel, silver and gold. More adult models will be made, but no children's.

Appeals Rules Amended

Washington

• • • OPA on March 10 amended the appeals provisions of all price schedules which permitted persons complaining of hardship to apply to OPA for a modification or exception from the schedule involved. Hereafter, all appeals must conform to the uniform procedure set forth in Procedural Regulation No. 1, issued Feb. 12.



Tanks and Half-Tracks

• • • WPB on Monday told producers of light and medium tanks and armored half track vehicles that they must hereafter apply for preference ratings under the Production Requirements Plan, P-90. In the meantime, they will receive priority assistance under orders P-25A-P-25E, P-26A-P-26E, and P-35. These orders, which were scheduled to expire March 31, have been extended for 60 days. In some cases, however, assignment of the orders to individual producers may be canceled before May 31.



• • • WPB has announced that frozen stocks of scarce metals may be sold to the Defense Supplies Corp., the Metals Reserve Co., or any other RFC corporation. WPB also ordered the extension of the ban on the use of "bright work" to all types of motor vehicles and trailers, prohibiting its use of replacement parts and accessories.

Under the new order, L-69, effective immediately, no producer may use or manufacture any "bright work" for the exterior finish or trim of any motor vehicle, the interior or exterior finish of any body or cab, or for any accessories or replacement parts. The use of bright trim on other articles is restricted to the average daily consumption during February. As in the past, there are certain exceptions to this prohibition.

New Priority Aid Given Railroads

Washington

• • • Giving new assistance to the railroads to enable them to obtain materials necessary to maintain and operate their properties, the WPB director of industry operations has issued Preference Rating Order P-88. It sets up a fourpoint rating system for materials

going into railroad maintenance and repair. It makes available:

and repair. It makes available:

1. An A-1-a rating for delivery of materials needed for emergency repairs upon specific approval of WPB.

2. A rating on deliveries of raw materials, with the quantity and rating to be determined by WPB on a quarterly basis.

3. An A-3 rating for delivery of materials essential for track, structure, signal, communication system, and train and locomotive repair and operation, including perishable tools. Use of this rating will be controlled by quarterly inventory statements to be submitted to WPB.

4. An A-8 rating on all other maintenance, repair and operating supplies, which also will be controlled by quarterly inventory.

How VEELOS V-Belt Can Help Win the War!

Here are 3 ways the exclusive link construction of Veelos V-Belt speeds production for victory!

- SAVES PRODUCTION TIME! With Veelos in rolls, strands of Veelos can be replaced in the bat of an eye, keeping all belts on the drive and maintaining equal tension.
- PERMITS OPERATION OF MACHINES AT MAXI-MUM RATED CAPACITIES! Veelos holds machine speeds at maximum because link construction provides quick, easy adjustment to end slippage.
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Let a Veelos sales engineerespecially trained in power transmission work-tell you the complete story of Veelos-the only V-Belt that offers the advantages of link construction.

MANHEIM MANUFACTURING & BELTING CO., MANHEIM, PA.



This Week's Priorities and Prices

- Copper scrap price schedule No. 20 amended with respect to railroad scrap repocessed under conversion agreements. (OPA:PM2690)
- Used typewriter rationing procedure esta Rationing Order No. 4. (OPA:PM2681) established in
- Lead products price ceilings discussed by industry and price officials. (OPA:PM2696)
- Plumbing and heating equipment repairs aided by rating of A-10 under order P-84 issued March 14. (WPB:533)
- Office machinery sales restricted to holders of ratings of A-9 or higher by order L-54-b, effective March 15. (WPB:548)
- Bright work ban extended to cover all types of motor vehicles and trailers in order L-69, effective March 14. (WPB:540)
- Affirmation of compliance need not be filed with the last 35 OPA price schedules issued by OPA. (OPA:
- Zinc price schedule No. 81 revised with respect to toll agreements and specifications. (OPA:PM2682)
- Steel casting price schedule No. 41 revised March 16 permitting certain extras for coupler repair parts and pattern costs. (OPA:PM2683)
- Bicycle production curtailed and use of strategic materestricted in order L-52 effective March 12. (WPB:517)
- Auto graveyard stock seized by WPB in first action against "recalcitrant" operators. (WPB:529)
- Aluminum sheet mill in Washington granted temporary preference rating of A-1-b. (WPB:530)

- Scarcity report covering 18 materials issued showing relative scarcity of each item. (WPB:506)
- Plane order P-109 amendment to eliminate distinction between material physically incorporated into air-craft products and other necessary material used by companies producing war planes. planes assigned rating of A-1-b in order P-109a. (WPB:511). Higher ratings assigned military aircraft in order P-122. (WPB:494).
- Production Requirements Plan amended to permit use of ratings assigned by other certificates to obtain material not regularly carried in stock. (WPB:513)
- Priority violations charged against two companies with respect to aluminum use; suspension orders issued prohibit both plants from handling aluminum. (WPB:515)
- Washing machine production to be halted shortly; procedure for such a step discussed at Washington meeting. (WPB:516)
- Form 25-PDa, in revised form, mailed for use with second quarter reports. (WPB:T162)
- Conversion progress reports to be sent monthly to WPB by firms going into war work. Report is made on form WPB:732. (WPB:489)
- Order P-79, covering non-metal containers, revised and extended to June 30. (WPB:497)

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB:300 means announcement 300 issued by the War Production Board.)

Revisions for The Iron Age Priorities Guide

- • Following material should be added to THE IRON AGE Priorities and Allocation Guide published with the issue of Jan. 29. Under "P Orders," page 4, add:
- P-19-e...Amendment No. 1-Prohibits extension of order ratings for a road project for obtaining road building machinery and equipment (3-16-42).
- P-39... Extends order; advises producers operating under the order to make use of Production Requirements Plan (P-90) (3-9-42).
- P-79... Revision-Paper containers included in list of items covered by order (3-11-42). Related form: PD-82.
- P-84...Plumbing and heating repairs assigned rating of A-10 (3-13-42).
- P-90... Amendment—Permits use of ratings assigned by other orders for obtaining material not regularly carried in stock (3-10-42). Related form: PD-25f.
- P-100 ... Amendment No. 2-Extends order to refrigerating equipment in stores and restaurants (3-9-42).
- P-109 ... Amendment Abolishes distinction material physically incorporated into product and other necessary material. Is retroactive with respect to certificates outstanding (3-11-42).
- P-109-a ... Assigns rating of A-1-b to mateiral for production of military and naval trainer type aircraft (3-11-42).
- P-122... Raises all previously issued certificates covering military and naval aircraft not covered by P-109 to A-1-a or A-1-b (3-11-42). Under "M Orders," page 8, add:
- M-1-g...Aluminum paint and pigment placed under allocation (3-10-42). Related forms: PD-312, PD-
- M-19... Amendment No. 1—P-19 to April 1 (3-9-42). . Amendment No. 1-Postpones effective date of

- M-21-c... Establishes allocation of steel plates (3-9-42). Related forms: PD-169, 169a, 299, 298.
- M-63... Amendment No. 3-Removes certain import restrictions on cadmium, zinc and lead ores (3-14-42).
- M-76... Land turbine production schedules established (3-9-42).
- M-86... Directs canners to set aside canned goods for war use (3-14-42).
- M-86-a... Establishes quantities of 1942 pack which canners must set aside for war use (3-14-42). Related forms: PD-342, 343.
- -95... Rhodium use in jewelry prohibited (3-11-42).
 Related forms: PD-295, 296.
 Under "L Orders," page 7, add:
- L-2-i... Permits sale of automobile plant steel inventories for war plants under specified conditions (3-9-42).
- L-26-a... Prohibits manufacture after May 1 of farm tractors requiring rubber tires (3-9-42)
- L-52...Restricts production of bicycles and bicycle parts (3-12-42).
- L-54... Amendment No. 1—Modifies order with respect to used typewriters (3-7-42).
- L-54-b... Purchase, sale and rental of new office machinery prohibited except to holders of rating of A-9 or higher issued on PD-1a or PD-3a (3-14-42).
- L-56... Restricts delivery of fuel oil to new oil burning installations in East and Northwest (3-14-42).
- L-58... Restricts sale and importation of sextants (3-11-42).
- L-61... Restricts production and distribution of tire retreading and recapping equipment (3-11-42)
- L-69... Extends ban on use of bright work on all types of motor vehicles and trailers (3-14-42).
- L170...Restricts delivery of gasoline in East and Northwest (3-14-42).

Think Only of War, Gas Group Urged

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• • • The present war situation as it affects the United Nations is more desperate than is generally thought, Lee Wilson, president, Lee Wilson Engineering Co., Cleveland, told members of the American Gas Association at an industrial and commercial gas conference here last week. "There is only one test to every action today," Mr. Wilson said, "and that is: Will it help to win the war?"

Mr. Wilson urged that gas applications be made where the greatest amount of efficiency will result and that all thoughts of competition with other types of fuel or energy should be put away until after the war, making sure that everything possible is done toward producing the greatest amount of armament in the shortest possible time.

Emphasizing the gigantic task facing the United States and its Allies, Mr. Wilson cited cases where, under some present methods of production, it takes approximately 18 days to prepare a steel, forging from which a gun barrel is made. In this process today, the batch type furnaces are used necessitating considerable time consumed in heating and reheating. As contrasted to this slow process, some German firms are preparing such forgings in two days and turning out 1000 a day at one plant. He urged that American inventiveness and ingenuity tackle this problem immediately toward extending continuous methods of heating in order to substantially step up the production of guns greatly needed by other armament.

The need for speed and more speed was indicated by the speaker when he pointed out that Hitler has been preparing for this war for years and that his main tool was efficiency, whereas in the Japanese case the intense hatred of some yellow people against the white race has furnished the impetus which keeps the Japs moving forward.

Substantiating Mr. Wilson's remarks by actual example, D. H. Thorburn, United Gas & Fuel Co. of Hamilton, Ltd., Hamilton, Ontario, set the AGA members on



"E" FOR KROPP FORGE: Before an audience of 2500 workers and their families, Rear Admiral John Downes, commanding officer of the Ninth Naval District, recently placed flags significant of "outstanding efficiency in production of ordnance material" in the hands of Roy A. Kropp, president of the Kropp Forge Co., Chicago. Admiral Downes told Kropp workmen that it is possible for the U. S. to lose the war through military negligence, and assembly line's slowdown or by wishful thinking.

their heels with the flat statement that three plants in Toronto today are using a total manufactured gas load equivalent to the total pre-war producing capacity of his company. Earlier in the day some talks had hinted that gas consumption in the United States would spiral upward over the next few years but such statements as were made were child's play compared with actual records presented by Mr. Thorburn.

For instance, Mr. Thorburn's company in 1939 showed an increase in total sales of approximately 1 per cent above the late 1938-early 1939 base. By 1940 the company sales had zoomed to 226 per cent above the pre-war base and in 1941 had increased 396 per cent. Citing actual plants, the situation within the company's territory as a result of conversion to war work was somewhat as follows: A company making gun barrels increased its gas load 20 per cent in 1939 over the pre-war level, 277 per cent in 1940, 515 per cent in 1941, and an estimated 900 per cent in 1942; a die casting company converted to war work required an increase in its gas load over pre-war levels in 1939 of 295 per cent, 614 per cent in 1940, and 1385 per cent in 1941; an auto plant converted to war work increased its gas load 49 per cent in 1940, 112 per cent in 1941, and 225 per cent in 1942; a bridge structural company increased its gas requirements over pre-war levels in 1939 to 298 per cent, in 1940 674 per cent, and in 1941 1839 per cent.

The speaker's company, making manufactured gas, curtailed gas for all space heating and even went so far to remove all conversion heaters in domestic houses but was forced to embark on a major expansion program.

Peace time accomplishments involving research in the use of gas over the past 10 years or more, must now be applied to the mechanics of war and were it not for the uninterrupted research and experimentation, this country would be far from the position it now is in, Henry M. Heyn, manager, heat treating division, Surface Combustion division, General Properties Co., Inc., Toledo, Ohio, told gas officials.

Citing cases of peace time production converted to war effort, the speaker pointed out that the manufacture of cartridge cases today is proceeding at an accelerated rate, due in some measure to earlier studies of the AGA which dealt with clean annealing of brass.

PERSONALS

- John Wilson of the Jessop Steel Co., Washington, Pa., has been promoted to the position of production superintendent. Joining the Jessop organization in 1911, he served in various capacities in the sheet mill, and in 1931 was made superintendent of this department.
- Walter C. Evans has been appointed general manager of three major divisions of the Westinghouse Electric & Mfg. Co., East Pittsburgh, namely, radio, broadcasting and X-ray. The individual managers of these divisions are Lee B. Wailes, broadcasting; Clair V. Aggers, X-Ray, and Carrol J. Burnside, radio. Mr. Evans has headed the company's broadcasting activities since 1936.
- Sam B. Heppenstall, Jr., formerly general sales manager, Heppenstall Co., Pittsburgh, has been made vice-president-in-charge-of-sales. Mr. Heppenstall entered the employ of the company as a laborer 14 years ago, was made assistant sales manager in 1933 and general sales manager in 1939.
- Roger Waindle, sales manager of the Fahralloy Co., Harvey, Ill., has been released by the company to go with the Chicago Ordnance District of the War Department.
- Fred H. Clausen, president of the Van Brunt Mfg. Co., Horicon, Wis., has been elected to the board of directors of the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., to succeed the late W. J. Radcliffe of Cincinnati.
- Thomas B. Myers, vice-president and general manager of the Scoville Mfg. Co., Racine, Wis., has been appointed to the advisory board of the Chicago ordnance district by Col. Donald Armstrong, district deputy chief.
- William H. Davidson has been elected president of the Harley-Davidson Motor Co., Milwaukee, to succeed the later Walter Davidson, his uncle, who died recently.
- Edward H. Hughes, sales manager for Jones & Laughlin Steel Corp. at the firm's St. Louis office since 1938, has been appointed sales manager of the Buffalo office.

- He succeeds Charles M. Mason who has been named head of the Cleveland office. George G. Marshall, who has been with the Buffalo office since 1934, was appointed assistant district sales manager there.
- N. F. Melville has been made manager of munitions sales for Pittsburgh Steel Co., Pittsburgh. Mr. Melville has been associated with Pittsburgh Steel in various sales capacities for the past 15 years and will continue his duties as manager of manufacturers' sales, which post he has held for the past six years.
- Gordon L. Crawford, previously sales manager of the Buffalo district, has been named assistant general sales manager of the Wickwire Spencer Steel Co., New York. Mr. Crawford will continue as sales manager of the company's structural products division.
- · A. H. Wardwell has been appointed director of industrial relations, Pittsburgh district of the Carnegie-Illinois Steel Corp. He goes to Pittsburgh from the South Works of the corporation in Chicago. Mr. Wardwell was graduated from Pennsylvania State College in 1916. At that time he was employed as a practiceman in the blast furnace department of the National Tube Co., progressing through various positions and was appointed superintendent of blast furnaces in 1923. In 1936 he joined the South Works of the corporation at Chicago as assistant to the general superintendent.
- · Ronald R. Monroe has been elected vice-president in charge of manufacturing and purchasing of the J. G. Brill Co., with headquarters at Philadelphia. Mr. Monroe's early business experience was gained in the Middle West. where he served as president of the Des Moines Foundry & Machine Co. for several years. In 1935 he became director and executive vice-president of the Utilities Power & Light Corp. which not only owned several utility properties but a number of manufacturing properties as well.
- Paul Keller, former manager of the company's Cleveland sales, has been appointed to manage the sales of tool, stainless and special steels for the Copperweld Steel Co., Warren, Ohio. Mr. Keller is



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JOHN WILSON, production superintendent, Jessop Steel Co., Washington, Pa.

- a graduate of the University of Tennessee and before being advanced to his new post was manager of Copperweld's Cleveland sales district.
- John B. Roys, secretary and comptroller of the Greenfield Tap & Die Corp., has been made a director.
- · C. M. Mason has been appointed district sales manager, Jones & Laughlin Steel Corp., Cleveland, succeeding E. A. France who has retired after 37 years of service with the company. Since October, 1938, Mr. Mason has been district sales manager in Buffalo. H. B. Shepherd, who has been associated with the J & L Cleveland sales office since 1929. has been named assistant district sales manager of that office. E. H. Hughes has been made district sales manager in Buffalo, and G. G. Marshall, who has been associated with the J & L Buffalo district sales office since 1934, has been appointed assistant district sales manager.
- L. S. Berkey has been appointed district sales manager in St. Louis. Since 1940 he has been resident manager of sales in Toledo, Ohio. E. S. Lewis has been named resident manager of sales in Toledo, and P. B. Turner has been made manager of export sales located

in New York, with W. R. Spindler as assistant.

- Kenneth J. Wilson has been named contract co-ordinator of Aircraft Components, Inc., Van Nuys, Cal. Formerly sales manager, Mr. Wilson has been connected with Aircraft Components since its formation.
- Ralph V. Hunt, comptroller of Douglas Aircraft Co., has been elevated to the position of vice-president of the company.
- Charles P. Hunt, identified with the aircraft industry for the past 12 years and formerly a member of the purchasing department of Douglas Aircraft Co., has been appointed purchasing agent for Menasco Mfg. Co., Los Angeles.
- T. R. Hill has been elected president of the Martin-Parry Corp., Detroit. Mr. Hill will continue as president of Rexair, Inc., which he has headed since its organization. He has been a director and vicepresident of Martin-Parry since its merger with Rexair a year ago. Martin-Parry, a former builder of truck bodies, is now engaged in production of gun mounts, ship interiors for the maritime commission and tank parts. L. H. Green, president of Automotive Materials Corp., Detroit, has been elected chairman of the board of Martin-Parry and Robert C. Shields of Fisher & Co. was elected a member of the executive committee.

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- Theodore W. Monroe has been elected president of the Hartford Electric Steel Corp., Hartford, and of its affiliated company, Roxbury Steel Casting Co., Boston. George C. Hagstrom, vice-president and sales manager, has been made executive vice-president of the Hartford Electric Steel Corp., and continues as vice-president of the Roxbury Steel Casting Co.
- John A. Finley has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to research in metallurgy.
- Ernest R. Breech has been elected president of Bendix Aviation Corp., Bendix, N. J., succeeding Vincent Bendix, who has become chairman of the board. Simultaneously, Mr. Breech announced his resignation as vice-president

of General Motors Corp. in charge of household appliances and aviation and as a member of the administration committee.

Mr. Breech began his business career in 1917 as accountant and auditor for Fairbanks, Morse & Co. In 1921 he resigned and spent the next three years gaining experience in the installation of factory cost and production control systems in several Chicago manufacturing firms. In 1923 he became comptroller of the Yellow Truck & Coach Mfg. Co., Chicago and Pontiac, Mich. In 1929 he was made general assistant treasurer of General Motors Corp., a position he held until 1933, when he became chairman of the board and president of North American Aviation, Inc., and president of the General Aviation Mfg. Corp. From 1931 to 1934 he was a direc-



WAR PRODUCTION RISES: War production in the Taylor - Wharton Iron & Steel Co.'s plants increased 36 per cent during the initial two months of this year, as compared to the same months of 1941, according to George R. Hanks, president of the 200 year old firm. The company has made munitions for every war in which the United States participated, and is negotiating with the government for extension of current munitions manufacture.

tor of T.W.A., Inc., and for part of that time also was president of both T.W.A. and Western Air Express. In January, 1935, Mr. Breech was made assistant to vice-president John L. Pratt of General Motors Corp., at which time he resigned as president but continued as chairman of North American Aviation.

. T. F. Barton of New York and W. B. Clayton of Dallas, Tex., have been elected commercial vice-president of the General Electric Co., Schenectady. Both have been district managers in their respective territories and will continue as such. Mr. Barton entered the employ of General Electric in 1906, the year he graduated from Clemson A. & M. College. He became district engineer of the New York territory in 1927, was appointed assistant manager of the district in 1939, and manager on Jan. 1, 1941. He has twice won the Charles A. Coffin Foundation award, highest honor which General Electric bestows upon its

Mr. Clayton joined General Electric in 1905 as a student engineer. In 1924, when the Southwest district was organized with Dallas as headquarters, Mr. Clayton was named manager of the Central Station department and assistant manager of the district. In November, 1939, he became district manager.

- S. B. Kingham, formerly assistant comptroller of the National Tube Co., Pittsburgh, has been elected comptroller, succeeding John Pugsley, who will become associated with the Tennessee Coal, Iron and Railroad Co., Birmingham, Ala.
- Edward Riley has been elected a vice-president of General Motors to succeed Graeme K. Howard, who has resigned as vice-president in charge of overseas operations. Mr. Howard is now serving in Washington as Deputy Chief, Motor Transport Division, Quartermaster Corps, United States Army. Mr. Riley has been general manager of General Motors Overseas Operations.
- G. S. Mican has been appointed assistant to general superintendent, production planning, of the South Chicago works of the Carnegie-Illinois Steel Corp. Mr. Mican has been employed at South

works since 1919, when he began as an apprentice in the machine shop. He subsequently served as a machinist, field foreman, assistant master mechanic of the machine department, and superintendent of the 96-in. plate mill. In 1940 he became superintendent of the structural and blooming mill and last year he was made assistant division superintendent of rolling.

E. W. Pierce, superintendent of the production department of Carnegie-Illinois South works since 1937, has been made assistant to the general superintendent, quality control, and R. A. Ballinger, assistant superintendent of the production department at Chicago, has been named to succeed Mr. Pierce as superintendent, production planning.

- R. L. McIlvaine, foundry engineer of the National Engineering Co., Chicago, since 1941, has been promoted to manager of engineering sales. Mr. McIlvaine had been associated with the Griffin Wheel Co. as cupola foreman and with the R. W. McIlvaine Co., of which he was president from 1930 to 1941. Before joining National Engineering, he had been connected with Swayne Robinson Co., Richmond, Ind., as its chief engineer and sales manager.
- T. A. Lynch, sales manager for the aeronautical industry for Reynolds Metals Co., Inc., Richmond, Va., has been elected a vicepresident of the corporation.
- French E. Dennison, in charge of the small commercial refrigeration development department of the York Ice Machinery Corp., York, Pa., has been called by the War Department to serve as chief inspector for the Philadelphia Ordnance District. During World War I. Mr. Dennison served with the Ordnance Department at Rock Island Arsenal and engineered the general refrigeration, water cooling and air conditioning systems at Rock Island. For many years he had been chief engineer of the General Refrigeration Co., Beloit, Wis., manufacturers of commercial refrigeration equipment.
- Gordon C. Sleeper, has been named a member of the executive staff of Republic Aviation Corp., Farmingdale, N. Y., as assistant to President Ralph S. Damon.

• Carnegie-Illinois Steel Corp. has announced Bennett S. Chapple, Jr., has been appointed assistant to vice-president, in charge of emergency defense coordination, and Robert J. Ritchey has been named assistant manager of the sales promotion department, in charge of the activities of the department in the absence of Mr. Chapple, former sales promotion manager.

OBITUARY ...

- Everett R. Hamilton, president and general manager of the National Pressure Cooker Co., Eau Claire, Wis., and founder of the aluminum industry in that city, died Feb. 24, aged 57 years. He was a native of Bloomington, Ill., and went to Eau Claire in 1914 to become assistant manager of the Northwestern Steel & Iron Co., which he later acquired and converted into an aluminum plant during the first World War.
- James E. Fisher, former assistant secretary and treasurer of Phelps-Dodge Mining Co., who retired Jan. 1 at the age of 60 because of illness, died in a Dickinson, N. D., hospital March 4.
- W. J. Clark, vice-president of the Lonergran Mfg. Co., Albion, Mich., died March 1 of a heart attack in Michigan City, Ind. He was 47 years old.
- John A. Callahan, former general manager of the plumbing ware division of the Briggs Mfg. Co., was buried at Buffalo, N. Y., March 4. Mr. Callahan died suddenly in New York. During the first World War, Mr. Callahan was an executive of the Curtiss-Wright Corp., Buffalo. Starting with the Briggs organization in 1934 when the metal plumbing division was created, he continued until three years ago when he resigned to become general manager of the marine division of Bendix Corp.
- William J. Young, founder of William J. Young Machinery Co., Lynn, Mass., died at his home in Peabody, Mass., March 3. He was born in Hampton, Nova Scotia, 77 years ago.
- John Edward Daily, operating district manager in Chicago for the Youngstown Sheet & Tube Co., died March 8, in the Illinois Central Hospital after a month's ill-

ness. He was 58 years old. Mr. Daily was associated with the steel industry for 37 years since his first employment as a construction engineer with Carnegie Steel Corp., at Youngstown, Ohio. Later he was connected with several steel companies including: Brier Hill Steel Co., Youngstown, Ohio; Sharon Steel Co., Sharon, Pa.; United Alloy Corp., and Timken Steel & Tube Co., Canton, Ohio and Wheeling Steel Corp., Steubenville, Ohio. He joined Youngstown in Chicago in 1934.

- Ray L. Williams, service manager for the Marion Steam Shovel Co., Marion, Ohio, where he was in his 32nd year as an employee, died suddenly of a stroke of apoplexy on March 5.
- H. L. Harrison, Ohio representative of Darwin & Milner, Inc., Cleveland, for over 12 years died March 3. Mr. Harrison had resigned from the company several months ago because of ill health.
- Arthur C. Kieckhefer, secretary and treasurer of the A. Kieckhefer Elevator Co., Milwaukee, for about forty years, died March 8, aged 59 years.
- Homer C. Vincent, who with Matthew Andis established the Andis Clipper Co., Racine, Wis., died March 8 on his farm at Fairhope, Fla., where he had lived after his retirement as sales manager of the Andis firm several years ago.
- M. C. Ronayne, master auditor of the International Harvester Co. Milwaukee plant and who sponsored and kept alive the annual Christmas party for employees' families given annually by the Milwaukee Works Harvester club, died March 4 at a Milwaukee hospital after several months' illness. He was 72 years old.
- Edward T. Fishwick, vice-president and director of the Worthington Pump & Machinery Corp., Harrison, N. J., died on March 15 at his home in Glen Ridge, N. J. Mr. Fishwick had been with the Worthington organization for 49 years, having started with the corporation at its Cincinnati Works. Mr. Fishwick was senior vice-president of the corporation. He was also president and director of the Worthington-Gamon Meter Co. of Newark.

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Armco Men Forego Fun to Fill Order

Middletown, Ohio

Middletown, Ohio

• • • Willingness to co-operate was demonstrated by American Rolling Mill Co. and its employees last Saturday. Armco received a request from the U. S. Navy for a special order of sheet steel as quickly as possible. Immediately a call went out to the employees, who left lunch stands, bowling games, movies, and other recreational pursuits to answer the call, and started to work immediately. For 18 hours men dressed in street and sport clothes bent to street and sport clothes bent to the task of filling the secret or-der, and then the first freight car rolled out of the company's car rolled out of the company's plant with the finished product. The Navy sent a terse message of gratitude, which read as follows: "The sheets were expedited in the most gratifying manner."

U. S. Steel's Greatest Year Is Summarized

• • • More than three-fourths of U. S. Steel's current steel shipments are for direct and indirect demands for defense and lend-lease needs, Irving S. Olds, chairman, disclosed in the 1941 annual re-

Steel production for military, naval, and other national emergency needs has been accelerated in every practical way, said Mr. Olds.

A feature of the report is a series of photographs depicting operations at U.S. Steel plants with special emphasis on the manufacture of armor plate.

The report stated that U. S. Steel's shipments of rolled and finished steel during the year totaled more than 20 million net tons-an all-time high and an increase of more than one-third over the shipments in 1940. The net tons of ingots produced by U.S. Steel subsidiaries also established an all-time record and represented an increase of more than onefourth over the 1940 production. Rolled and finished steel production was maintained throughout the year in excess of full rated capacity, and ingot production was within a few points of full rated capacity.

Weekly Bookings of Construction Steel in Tons

Week Ended	Mar. 17,	Mar. 10,	Feb. 17,	Mar. 18,	Yearto	Date
	1942	1942	1942	1941	1942	1941
Fabricated structural steel awards	3,000	5,125	22,900	25,100	244,685	358,875
Fabricated plate awards	0	2,000	350	1,250	8,450	32,655
Sheet steel piling awards	0	0	0	100	790	6,215
Reinforcing bar awards	39,500	31,000	36,000	24,150	381,725	128,040
Total letting of Construction Steel	42,500	38,125	59,250	50,600	635,650	525,785

Gear Sales Set New Record

• • • Sales of industrial gears in February reached a new all time high, the American Gear Manufacturers Association reports. The association's index of sales for February stood at 353, as compared with the previous high of 299 in June, 1941. The index for January of this year was 288 and for February, 1941, was 262. The sales index does not cover automotive gears or high speed turbine drive gears.

3 Railroads Found With High Inventories

Washington

• • • Because reports showed that their inventories exceed their average monthly use, suppliers of steel plates have been given telegraphic instructions by WPB to make no further shipments except for locomotive boilers and fire boxes to the Pennsylvania, New York Central and Louisville & Nashville railroads.



Stampings May Replace Castings and Forgings

Cleveland

o • The Cleveland Ordnance office of the War Department has been working upon the possibility of developing stamping methods to produce various tank parts and shell pieces in order to make available the growing number of idle presses in this area. Along this line THE IRON AGE was shown five different types of forgings or castings, all of which had been effectively duplicated by using heavy presses, usually around the 300ton range. Thus far, this work is purely experimental. Col. H. M. Reedall, in charge of the local ordnance office, pointed out that these developments would help relieve the pressure upon forging and casting facilities in addition to eliminating the necessity for heat treating some of these parts.

Several machine tool observers returning from visits to the West Coast report that they have seen drill presses, milling machines and other units in warehouses and showroom floors in the Los Angeles district.

Machine Usage Being Surveyed

Chicago

• • • Though the problem of getting delivery on new machine tools is still very much a headache for everyone, army ordnance officials in this area are considerably worried about the working hours of tools already installed. The Chicago Ordnance District is now launching an overall survey of actual hours present machines are working. Estimates run all the

way from 20 to 50 per cent of installed equipment operating less than three and two shifts per day. On a three-shift basis, it would probably hit the 50 per cent figure easily; and it is conservative to say that only 25 per cent of machine tools are working less than two shifts daily. When the survey is completed, the newly installed small businessman's section of the Chicago Ordnance will use the data in forcing spreading of war contracts to smaller metal plants.

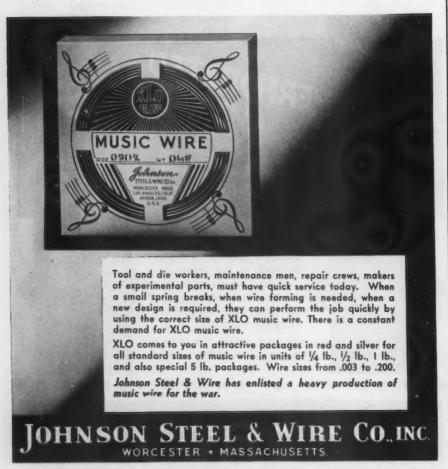
Despite the complaint about deliveries, a number of army contractors are getting excellent service on their new equipment orders. One shot maker in southern Illinois received a new centerless grinder within five weeks of his initial order. The same firm has received other new machine tools within six weeks of the time they were ordered.

Not Employing Women Yet

Cincinnati

• • • While district machine tool builders are still talking about the question of the employment of women in their shops, the necessity to do so has not arisen. So far, manufacturers indicate that there are still a lot of men available, although unskilled. The closing of the General Motors local plant and the virtual closing of automobile dealers' places has released a large number of men, while the curtailment of operations in civilian plants has also produced a reservoir of available labor. All these workers, however, require training and the local manufacturers are proceeding to absorb as much as is humanly possible of this available labor. Plants running on a threeshift basis report sufficient men to keep all machines running on an around the clock basis, but full complement of personnel for nonoperative work is not possible on second and third shifts.

New business continues to come in without let up, and one manufacturer reports that February was the largest month in the history of the company, both in the receipt of new business and in the shipment of finished products.



NEW YORK · AKRON · DETROIT · CHICAGO · LOS ANGELES · TORONTO

110-THE IRON AGE, March 19, 1942

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Aircraft Program to Get All Aluminum

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• • • Leading the news out of Washington this week was word that the goal in this country is to use 100 per cent of aluminum production for aircraft construction on a permanent basis instead of on a 90-day basis, as originally planned. This program will be put into operation as quickly as possible. At present, about 85 per cent of prime aluminum output is going into aircraft.

Form PD-213, covering application for April tin allocations, was mailed to consumers during the past week. Full details as to the amount of tin on hand, fabricated or unfabricated; unfilled purchases as of March 1; and estimated requirements according to preference ratings must be sent on this form to the Tin-Lead Branch of WPB by March 23. The revised PD-213 requires a forecast of requirements three months in advance.

Under instructions from Washington, jobbers are still rationing their tin supplies as follows: 70 per cent to consumers with A-3 ratings or better, 20 per cent to consumers with ratings from A-4 to A-10; and 10 per cent to civilian consumers below A-10, but not giving any buyer more than 50 per cent of what was required during first quarter of 1941.

Production of crude copper during February dropped to 80,303 tons, from 88,205 tons in January, entirely because of the short month. The daily production average during February was slightly higher. Refined production likewise declined from 90,017 tons in January to 81,724 tons in February. Stocks during February fell slightly over 4000 tons, from 81,371 tons on Jan. 31 to 77,329 tons on Feb. 28.

Production of copper by Phelps Dodge Corp., from company mines and purchased ores amounted to 181,790 net tons during 1941, compared with 159,532 tons in 1940. Phelps Dodge refiners produced 280,165 tons of refined copper. Of the \$21,006,158 spent on capital improvements by the company, \$18,400,220 were spent on the Morenci, Ariz., development and there remains an estimated expenditure of about \$5,700,000 to complete the five-year development program started in 1937.

While MRC announced premiums would be paid for over-quota zinc and lead production in the Tri-State District, basic production quotas for individual producers have not been agreed upon by the joint committee from WPB and OPA. It was agreed, however, that when the basic production quota was established, producers would be paid over-quota premiums retroactive to Feb. 1.

MRC zinc shipping agents received releases covering deliveries for government account during the past week, and contracts were quickly sent out. WPB set March

25 as the date for the customary monthly meeting with producers to consider consumer allocations, production outlook, and pool needs for April. Early return of form PD-66-a will facilitate this meeting.

Non-Ferrous Prices

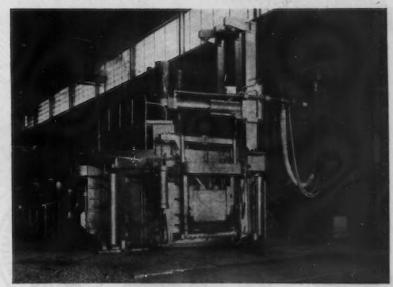
(Cents per lb.		fa	r		e	ZF.	ly		d	e	T å	876	eı	.3	()	
Copper, Electrolytic1																12.00
Copper, Lake																
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Zinc, East St. Louis2				6			s. s	*	*					*	×	8.25
Lead, St. Louis									*					*		6.35

Mine producers' quotations only, delivered Conn. Valley. Deduct 4c. for anproximate New York delivery price. Add 0.39c. for New York delivery. Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, 16.50c. a lb., New York; American, 14c. a lb., f.o.b. smelter. Quick-silver, \$191 and \$193 per 76 lb. flask, f.o.b. shipping point. Brass Ingots, commercial 85-5-5-5, 13.25c. a lb.

THE LARGEST TOP CHARGE ELECTRIC FURNACE IN THE UNITED STATES



LECTROMELT furnaces are built in sizes ranging from 100 tons to 25 pounds. Both door charge and top charge types are available. Rugged and durable construction. Rapid and economic operation.

PITTSBURGH LECTROMELT FURNACE CORP.

Consumer Slated to Absorb Increase in Rail, Truck Rates

• • • Absorption of higher freight rates by scrap consumers appeared logical early this week following the I.C.C. decision rejecting OPA's appeal against higher tariffs.

Instead of amending the scrap schedule, which would result in great confusion, OPA inclined toward leaving shipping point prices unchanged on scrap, requiring consuming foundries and steel mills to absorb the additional freight.

This is what the scrap trade expected ever since the I.C.C. announced higher freight rates, but OPA's sudden appeal late last week threw the matter into confusion.

Other recent highlights in the

scrap picture include: the government's crackdown on an Indiana yard and its slashing of red tape to purchase metal from an abandoned railroad at New York: reports from principal centers that scrap is flowing seasonally better: a warning by Irving Olds, chairman of U.S. Steel Corp., that scrap shortages may constitute a serious limitation on ingot production in 1942; an estimate by the Philadelphia regional office of BIC that a total of 19 open hearth furnaces are down over the nation this week. either completely or partly because of the shortage of scrap.

Recommendations for bettering the iron and steel scrap situation in 1942 were made by Edwin C. Barringer, president and executive secretary of the Institute of Scrap Iron & Steel Inc., testifying before the military affairs committee of the House of Representatives. The suggestions included:

Special consideration to be given dormant scrap that cannot be moved within the present price schedule on account of extra costs involved all under government supervision and without extra compensation for the scrap

dealer.

Exempt scrap from the freight rate increase recently ordered and place in the same position as iron ore which was not affected by recent ICC ruling.

Reduce carload minima on sheet scrap now in out-of-the-way places which must be moved by freight to shears and presses.

Prohibit direct dealing between steel mills and scrap producers to present cross-hauling.

and scrap producers to prevent cross-hauling and use of scrap for purposes other than it is best fitted for.

best fitted for.

Get Treasury to permit tax write-offs on obsolete plants and equipment provided work is done in limited time to help war effort.

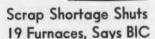
Have Army and Navy sell their scrap from arsenals and plants as soon as it is produced under OPA schedules but without red tape.

Investigate industry and if findings warrant, as they will, give it a clean bill and stop harassment and sniping so that the best possible job can be done.

Charges that more steel production had been lost by strikes and walkouts engineered by the CIO in steel mills and scrap yards than by shortage of scrap iron and steel were made by Barringer.

"There is nothing in any government statistical report or any information coming to my office that supports the slightest hint of hoarding," he said.

Average daily scrap iron and steel consumption by steel mills in February, 1942, reached an all-time high record figure according to Barringer. Consumption was \$4,276,000 gross tons, compared with 4,172,000 gross tons in February, 1941.



Philadelphia

• • • According to information from the Philadelphia regional office of the Bureau of Industrial Conservation, a total of 19 open hearth furnaces were reported down this week either completely or partly because of the shortage of scrap.

Plants with one furnace down (presumably in addition to furnaces normally idle for repairs) were reported to include: American Rolling Mill, Butler; Pittsburgh Steel Co., Monessen; Carnegie-Illinois, Pencoyd; Phoenix Iron Co., Phoenixville, Pa. Plants with two down: Bethlehem Steel, Lackawan-



Collection of Cans Costs City \$50 Ton

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● ● In two days last week 157 tons of tin cans were picked up by 242 sanitation trucks in New York. It cost the city \$50 a ton to make the collection. The containers bring \$10 per ton, less freight. Vigorous attempts are being made to train householders to clean, cut and flatten their cans. Demonstrating proper methods, an official cut his thumb.

• • More than enough fine tool steel scrap to make a battleship is lying around in Eastern Pennsylvania and Southern New Jersey factories and should be consigned to the scrap heap, according to R. D. McGiffert of the WPB at Philadelphia. Close to 10,000 tons of auto tools and dies are lying unused in one plant alone. They are owned by auto makers. Permission for scrapping has been sought from the owners and if not forthcoming soon, the possibility of requisitioning will be considered, McGiffert said.

• • Several hundred elevated railway cars are standing in yards at 159th Street and Eight Avenue, New York, and in other locations. They have been there ever since the "L" lines were discontinued. The Board of Transportation says the government is negotiating for them

• • • In seven weeks of the United Kingdom scrap campaign, up to the end of February, collections were 176,000 tons, averaging 25,000 tons weekly. The weekly rate is gradually rising toward 40,000 tons, the goal required.

• • From St. Louis comes word that WPA has found 18,000 tons of abandoned street car rails in six cities. St. Louis itself has 8128 tons; Kansas City, 8160 tons; St. Joseph, 730; Girardeau, 312; Springfield, 388; Independence, 400, and Joplin, 10. WPA has offered to dig up the rails.

• • • Col. H. M. Reedall, Cleveland ordnance office of the War Department, reports that his unit has been instrumental in securing 285,000 tons of scrap for needy war plants since Jan. 1 of this year.

♦ ♦ At Pittsburgh a city-wide drive for scrap will take place April 11 and 12 with the use of approximately 250 trucks. The material will be hauled to two or three centrally located dumps where bids will be received later. The collection includes all types of scrap. On the basis of a sample collection made some time ago a fairly high collection rate for household is expected.

na; Republic Steel, Youngstown; Sharon Steel, Lowellville; Carnegie-Illinois, Duquesne. Three down— Granite City Steel Co., Granite City. Four down—Ford Motor Co. PITTSBURGH—Scrap is coming out in about the same volume as a week ago with support still being received from automobile graveyard scrap. Graveyard material is not reaching volume as great as original estimates, but some brokers are getting surprisingly good results. The lack of burners has slowed up collections on the part of some interests which probably bid on more automobile scrap than they could handle.

Indicative of many localities is the situation in Allegheny County, Pa., where officials offered approximately 1400 tons of abandoned stretches of street railway and railroad tracks for the war program. These abandoned lines were taken over by the county for various highway, bridge and street improvements. Chief obstacle to salvaging such scrap is the cost of digging up and preparing the rails and repaving streets which is said to run in some cases as much as \$20 a ton. Brokers, dealers and consumers cannot do this because of the prohibitive cost. Efforts are being made to put WPA workers on such projects. It is estimated that perhaps 1,000,000 tons of such material exists in the United States.

ST. LOUIS—The increased flow of scrap iron enabled Granite City Steel Co. to put on two additional furnaces, to bring operations to eight. The material

is coming mostly from nearby territory and from farms and auto graveyards. Granite City was allocated between 15,000 and 20,000 tons of scrap during the week. Railroad material, which had been frozen temporarily, has been released.

PHILADELPHIA — A campaign in Pennsylvania and New Jersey to salvage thousands of tons of steel in old license plates was announced March 15 by Atlantic Refining Co. Atlantic dealers will change motorists' license plates during the next two weeks free of charge, collect the old plates which are turned in, sell the collected plates for scrap, and turn over proceeds to a national war fund.

CHICAGO — After maintaining high operations during the past six months while other sections occasionally slumped, steel mills in this area finally are facing the inevitable. Scrap is now no more than "even" at the best, incoming shipments about even with daily consumption. In some cases, even this ratio is not being maintained. Some mills have their own men spending two or three days a week driving through the countryside in search of scrap. In fact, it was these endeavors that led to the downfall of the auto graveyard in Valparaiso, Ind.

(Turn Page for More Scrap News)



You can increase drill press capacity and portable drill utility with these MARVEL Hole Saws.

These blades cut holes up to 11/8" deep from 3/4" to 41/8" diameter in any metal. With high speed steel teeth they will not "burn"; have the "set" to give

proper clearance for chips on deep cuts; and provide a high speed cutting edge which is welded by patented process to a non-breakable vanadium steel body or cup.

MARVEL Arbors for these saws have tough, hardened hexagon shanks, fitting either 2 or 3 jaw chucks with high speed pilot drills or centering point.

MARVEL Hole Saws will save time and money in cutting large diameter holes anywhere. Use them for economy in production and service.

ARMSTRONG-BLUM MFG. CO. "The Hack Saw People"
5700 Bloomingdale Ave., Chicago, U. S. A.
Eastern Sales Office: 199 Lafayette St., New York

ARMSTRONG-BLUM MFG. CO, "The Hack Saw People" 5700 Bloomingdale Ave., Chicaga U.S.A. Eastern Sales: 225 Eafgyette St. N. Y

TORONTO—Increased offerings of scrap have relieved some of the more pressing current needs, but Canadian melters are still faced with a serious shortage. It is estimated the scrap supply will be more than 500,000 tons short this year and there seems little prospect of gaining this additional tounage by imports.

BIRMINGHAM — Although the scrap situation is still serious in this district, there are indications that supplies are loosening up. Governmental pressure on auto graveyard operators and scrap allocations apparently is showing results.

WASHINGTON—Enumeration of auto graveyards and their contents of abandoned cars in and near cities of 15,000 and more has been completed by WPA field forces. All state reports have now reached the WPA central office in Washington and are being turned over to the WPB's Bureau of Industrial Conservation. In rural areas the survey was made by the Department of Agriculture.

BOSTON — Yards report a slight improvement in farm and automobile scrap supplies with the percentage of gain of farm larger than of automobile. State agencies estimate between 15,000 and 20,000 tons of abandoned street rails are

available in Boston, 8000 tons in West Springfield, and 49,000 tons in all Massachusetts. On the other hand, steel mill representatives estimate close to 100,000 tons are buried in New England highways. Barge shipments are held up by lack of barges.

Auto Graveyard Section Set Up in Eastern Pennsylvania

Philadelphia

• • • A new Automobile Gravevard Section of the Bureau of Industrial Conservation, headed in the Eastern Pennsylvania area by W. Thomas Hoyt, will be in charge of the program to move scrap stocks from automobile graveyards within the next 90 days. George Lang, purchasing agent for Phoenix Iron Co., Phoenixville, Pa., will represent Eastern Pennsylvania steel producers and take the primary responsibility for seeing that fair prices are offered for graveyard scrap, aside from usable parts.

Scrap Yard Seized; Red Tape Is Slashed By U.S. to Get Rails

Washington

• • • Frank Schumak owned a little auto junk yard near Valparaiso, Ind., last Thursday. But, on Friday, he didn't. His 150 tons of scrap were seized by the government because he wanted \$562.50 more for his wrecked cars than the government thought he should have. However, it took the combined efforts of the WPB, the OPA, the RFC, and the Department of Justice, plus the agents of a large steel company and another scrap buyer to make him yield his scrap for the war effort.

The WPB requisitioning and inventory control section ordered the seizure of Schumak's stock of scrap after a report by the automobile graveyards section of the Bureau of Industrial Conservation that the yard owner was "openly defiant" in refusing "fair offers" made by scrap consumers. Schumak wanted \$22 a ton, instead of the \$18.75 top provided by the OPA ceiling.

Ergo, a United States marshal, Justice Department, presented Schumak with an order requisitioning his yard, and the contents were removed by steel company trucks. The Metals Reserve Corp., RFC subsidiary, will pay Schumak a fair price for his material, WPB said, and will be reimbursed by the buyer.

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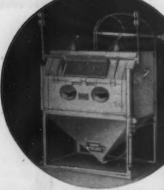
New York

• • • The major bottleneck preventing the use of 15,000 tons of steel and nonferrous metal in war production was broken here March 13, when the Metals Reserve Co. took ownership of the entire metallic content of the abandoned New York, Westchester & Boston Railroad. The price paid was \$423,600.

The railroad has been unused for many years. Last November the local U. S. District Court accepted a bid of \$550,000 for the property but title questions arose. With his watch in hand, Frank S. Williams of WPB expedited the court proceedings last week. Bids for demolition and removal of the metal were sought immediately by the government.

SAND BLASTING Made Easy for Defense Production!

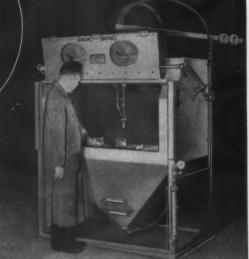
Ruemelin Sand Blast Cabinets put blast cleaning operations on a faster, more efficient basis. Eliminate dust, permitting installation anywhere in the plant. No skilled labor required. Sturdily constructed. Handles sand or steel abrasives. Prompt delivery.



RECOMMENDED FOR:

- 1. Heat treating plant removing scale, oxides.
- 2. Aircraft production—cleaning welds, metal preparation.
- 3. Foundries, ferrous and nonferrous — cleaning castings.

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Ruemelin cabinet with door open. Provides quick access for loading and unloading.

RUEMELIN Blast Cleaning Cabinets

(All the prices given below are per gross ton and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

BASIC	OPEN HEARTH GRA		BLAST RNACE GRADES			ELECTRI	C FURNA	ACE, AC	ID OPEN	HEARTH	AND	FOUND	RY GRAD	ES	
	No. 1 Hydr. Com- oressed Black Sheets:	,,,	(Mixed Borings and Turnings:	-	ow Phos			vy Struc			Cut Auto		Alloy free Low	Heavy Axie and	
	No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	Billet. Bloom, Forge Crops	Bar Crops and Smaller	Punch- ings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	Phos. and Sulphur Turnings	Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren,															
Youngstown, Weirton	\$20.00	\$16.00	\$16.00	\$25.00	\$22.50	\$22.50	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00
Cleveland, Middletown, Cincinnati, Portsmouth Chicago, Claymont, Coatesville, Conshohocken, Harrisburg.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19 00	20.50
Phoenixville, Sparrows Pt. Ashland, Ky. Suffalo, N. Y. Bethlehem, Pa.; Kokomo. Ind. Duluth, Minn. Detroit, Mich.	17.85	14.75 15.50 15.25 14.25 14.00 43.85 13.85	14.75 15.50 15.25 14.25 14.00 13.85	23.75 24.50 24.25 23.25 23.00 22.85	21.25 22.00 21.75 20.75 20.50 20.35	21.25 22.00 21.75 20.75 20.50 20.35	19.75 20.50 20.25 19.25 19.00 18.85	20.25 21.00 20.75 19.75 19.50 19.35	20.75 21.50 21.25 20.25 20.00 19.85	18.75 19.50 19.25 18.25 18.00 17.85	19.25 20.00 19.75 18.75 18.50 18.35	19.75 20.50 20.25 19.25 19.00 18.85	16.75 17.50 17.25 16.25 16.00 15.85	18.25 19.00 18.75 17.75 17.50 17.35	19.75 20.50 20.25 19.25 19.00 18.85
Toledo, Ohio	17.50	13.50	13.50	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Pittsburg, Cal.; San Francisco Minnequa, Colo. Seattle, Wash. Portland, Ore.	16.50 14.50	13.00 12.50 10.50	13.00 12.50 10.50	22,00 21,50 19,50	19.00	19.50 19.00 17.00 15.50	18,00 17,50 15,50 14,00	18.00	18.50 16.50	17.00 16.50 14.50 13.00	15.00	15.50	14.50 12.50	16.50 16.00 14.00 12.50	18.00 17.50 15.50 14.00

Rails

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Bundles with less than 50% tin coated material are \$5 per gross ton below basic open hearth grades; those with more than 50% tin coated material are \$8 below basic open hearth grades.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest prevail, or if unpublished 75c. per ton must be included as part of the deduction. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points, take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transport

*At Memphis deduct 50c.: Great Lakes ports \$1: New England \$1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than \$1, but not more than \$5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than \$5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton en consumer-owned unprepared remote scrap (see order).

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use in explosive making) add \$5 to price of cast iron borings; for chemical use outside explosives making, add \$3.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

				S	crap Rai	ls
	No. 1 RR Heavy Melting	Scrap Rails	Rails for Reroiling	3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	\$20.50	\$21 50	\$23.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville.	120.30	121 30	323.00	323.30	323.83	324.00
Wheeling, Youngstown Chicago, Philadelphia.	21 00	22.00	23.50	24.00	24.25	24.50
Sparrows Pt., Wilmington Birmingham, Los Angeles.	19.75	20.75	22.25	22.75	23.00	23.25
San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	13,85	21.35	21.85	22.10	22.35
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind	19 25	20.25	21.75	22.25	22.50	22.7
Seattle	15.50	16.50	18.00	18.53	18.75	19.0
St. Louis	18.50	19.50	21.00	21.50	21.75	22.0

CAST IRON SCRAP

Other Than Railroad Scrap

	Greup A	Group B	Group C
No. 1 cupola cast	\$18.00	\$19.00	\$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	15.50	17.59
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: states not named in A and B; switch district of Kansas City. Kan., Mo.

Comparison of Prices

(Advances Over Past Week in Heavy Type; Declines in Italics)

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: Mar. 17 (Cents Per Lb.) 1942	, Mar. 10, 1942	Feb. 17, 1942	Mar. 18, 1941	Pig Iron: Mar. 17, Mar. 10, Feb. 17, Mar. 1 (Per Gross Ton) 1942 1942 1942 1942	18,
Hot rolled sheets	2.10 3.05 3.50 2.10 2.80 2.10	2.10 3.05 3.50 2.10 2.80 2.10 28.00	2.10 3.05 3.50 2.10 2.80 2.10 28.00	No. 2 fdy., Philadelphia\$25.84 \$25.84 \$25.84 \$25.84 No. 2, Valley furnace 24.00 24.00 24.00 24.00 No. 2, Southern Cin'ti 24.06 24.06 24.06 24.06 No. 2, Birmingham 20.38 20.38 20.38 20.38 No. 2, foundry, Chicago† 24.00 24.00 24.00 24.00 Basic, del'd eastern Pa 25.34 25.34 25.34 25.34 Basic, Valley furnace 23.50 23.50 23.50 23.50 Malleable, Chicago† 24.00 24.00 24.00 24.00 Malleable, Valley 24.00 24.00 24.00 24.00 24.00	34 00 06 38 00 34 50
Tin and Terne Plate: (Dollars Per Base Box) Tin plate	\$5.00	\$5.00	\$5.00	L. S. charcoal, Chicago. 31.34 31.34 31.34 30.3 Ferromanganese‡120.00 120.00 120.00 120.00	34
Manufacturing ternes 4.30 Bars and Shapes:	4.30	4.30	4.30	†The switching charge for delivery to foundries in the C cago district is 60c. per ton. ‡For carlots at seaboard.	Chi-
(Cents Per Lb.) Merchant bars 2.11 Cold finished bars 2.6		2.15 2.65	2.15 2.65	Scrap: (Per Gross Ton)	
Alloy bars 2.70 Structural shapes 2.10 Stainless bars (No. 302) 24.00	2.70 2.10	2.70 2.10 24.00	2.70 2.10 24.00	Heavy melt'g steel, P'gh.\$20.00 \$20.00 \$21.0 Heavy melt'g steel, Phila. 18.75 18.75 20.0 Heavy melt'g steel, Ch'go 18.75 18.75 20.0	00
Wire and Wire Products: (Cents Per Lb.)		0.00	0.00	No. 1 hy. comp. sheet, Det. 17.85 17.85 17.85 17.5 Low phos. plate, Youngs'n 23.00 23.00 24.0 No. 1 cast, Pittsburgh 22.00 22.00 22.00 23.5	00
Plain wire		2.60 2.55	2.60 2.55	No. 1 cast, Philadelphia. 24.00 24.00 24.00 24. No. 1 cast, Ch'go* 21.00 21.00 21.00 21.	
Rails: (Dollars Per Gross Ton)				*Changed to gross ton basis April 3, 1941.	
Heavy rails\$40.0 Light rails 40.0			\$40.00 40.00	Coke, Connellsville: (Per Net Ton at Oven)	
Semi-Finished Steel: (Dollars Per Gross Ton)				Furnace coke, prompt \$6.00 \$6.00 \$5. Foundry coke, prompt 6.875 6.875 5.	.50 .75
Rerolling billets \$34.0 Sheet bars 34.0 Slabs 34.0	0 34.00	\$34.00 34.00 34.00	\$34.00 34.00 34.00	Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	
Forging billets 40.0 Alloy blooms, billets, slabs 54.0	0 40.00	40.00	40.00	Copper, Lake, New York. 12.00 12.00 12.00 12.	.00
Wire Rods and Skelp: (Cents Per Lb.)				Zinc, East St. Louis 8.25 8.25 8.25 7.	.25
Wire rods 2.0 Skelp (grvd) 1.9				Antimony (Asiatic), N. Y. 16.50 16.50 16.50 16.	5.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 115 to 122 herein.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

FINISHED STEEL March 17, 1942	PIG IRON\$23.61 a Gross Ton \$23.61 a Gross Ton \$23.61 a Gross Ton \$23.61 a Gross Ton	SCRAP STEEL\$19.17 a Gross Ton\$19.17 a Gross Ton \$19.17 a Gross Ton \$20.33 a Gross Ton
High 1941. 2.30467c., 2.30467c., 2.30467c., 1940. 2.30467c., Jan. 2 2.24107c., Apr. 16 1939. 2.35367c., Jan. 3 2.26689c., May 16 1938. 2.58414c., Jan. 4 2.27207c., Oct. 18 1937. 2.58414c., Mar. 9 2.32263c., Jan. 4 1936. 2.32263c., Dec. 28 2.05200c., Mar. 10 1935. 2.07642c., Oct. 1 2.06492c., Jan. 8 1934. 2.15367c., Apr. 24 1.95757c., Jan. 2 1933. 1.95578c., Oct. 3 1.75836c., May 2 1932. 1.89196c., July 5 1.83901c., Mar. 1 1931. 1.99629c., Jan. 13 1.86586c., Dec. 29 1930. 2.25488c., Jan. 7 1.97319c., Dec. 9 1929. 2.31773c., May 28 2.26498c., Oct. 29 A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States out. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.	18.84, Nov. 5 17.83, May 14 17.90, May 1 16.90, Jan. 27 16.90, Dec. 5 13.56, Jan. 3 14.81, Jan. 5 13.56, Dec. 6 15.90, Jan. 6 14.79, Dec. 15 18.21, Jan. 7 15.90, Dec. 16 18.71, May 14 18.21, Dec. 17 Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	High \$22.00, Jan. 7 \$19.17, Apr. 10 21.83, Dec. 30 16.04, Apr. 9 22.50, Oct. 3 14.08, May 16 15.00, Nov. 22 11.00, June 7 21.92, Mar. 30 12.92, Nov. 10 17.75, Dec. 21 12.67, June 9 13.42, Dec. 10 10.33, Apr. 29 13.00, Mar. 13 9.50, Sept. 25 12.25, Aug. 8 6.75, Jan. 3 8.50, Jan. 12 6.43, July 5 11.33, Jan. 6 8.50, Dec. 29 15.00, Feb. 18 11.25, Dec. 9 17.58, Jan. 29 14.08, Dec. 3 Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel ...

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Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

													DELI	VERED	то
Product	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS Hot rolled	2.10€	2.10€	2.10 €	2.10¢	2.10∉	2.10¢	2.10¢	2.10¢	2.20€	2.10¢		2.65∉	2.20€	2.34¢	2.27¢
Cold rolled ¹	3.05€	3.05∉	3.05∉	3.05€		3.05∉	3.05∉		3.15∉	3.05€		3.70∉	3.15¢	3.39∉	3.37¢
Galvanized (24 ga.)	3.50€	3.50€	3.50 €		3.50€	3.50∉	3.50€	3.50∉	3.60≰	3.50∉		4.05∉		3.74∉	3.67€
Enameling (20 ga.)	3.35€	3.35≰	3.35∉	3.35€			3.35∉		3.45€	3.35€		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80∉		3.80∉	-								-4.55¢			
STRIP Hot rolled ³	2.10¢	2.10¢	2.10∉	2.10∉	2.10∉		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled	2.80€	2.90€					2.80∉	(Wor	cester =	3.00¢)			2.90∉	3.16¢	
Cooperage stock	2.20≰	2.20€			2.20¢		2.20∉							2.56€	
Commodity C-R	2.95€			2.95∉			2.95#	(Wor	cester =	3.35€)			3.05€	3.31 €	
TIN PLATE Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
BLACK PLATE 29 gage *	3.05€	3.05∉	3.05€						3.15¢			4.05¢			3.37
TERNES, M'FG. Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS Carbon steel	2.15¢	2.15€	2.15€	2.15¢	2.15	2.15		(D	uluth =2	.25¢)	2.50€	2.80¢	2.25∉	2.49€	2.47
Rail steel	2.15	2.15∉	2.15∉	2.15	2.15	2.15					2.50¢	2.80¢			
Reinforcing (billet)	2.15	2.15∉	2.15€	2.15	2.15	2.15	2.15€	2.15€			2.50€	2.55€	2.25¢	2.39¢	
Reinforcing (rail)?	2.15	2.15€	2.15€	2.15	2.15	2.15	2.15¢				2.50≰	2.55¢	2.25∉		2.47
Cold finished®	2.65	2.65€	2.65€	2.65		2.65			(Detro	it = 2.70	9			3.01¢	2.97
Alloy, hot rolled	2.70	2.70€				2.70	£ (Bethleh	em, Mas	silon, Ca	nton =2.	70¢	2.80¢		
Alloy, cold drawn	3.35	3.35€	3.35	3.35		3.35	É						3.45¢		
PLATES Carbon steel	2.10	£ 2.10¢	2.10	2.10	2.10		2.10¢		2.25¢		2.45¢	1	2.25∉	2.29¢	2.15
Wrought iron	3.80	é													
Floor plates	3.35	₹ 3.35€									3.70€	4.00¢		3.71¢	3.67
Alloy	3.50	€ 3.50€			(Co	tesville	=3.50¢)				3.95€	4.15¢		3.70∉	3.37
SHAPES Structural	2.10	€ 2.10€	2.10		2.10	2.10	é	(Bethleh	em =2.1	0¢)	2.45	2.75¢		2.27¢	2.21
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80	£		2.80	É		(Wo	rcester =	3.00€)						
0.51 to 0.75 Carbon	4.30	¢		4.30	É			rcester =					-		-
0.76 to 1.00 Carbon	6.15	¢		6.15	¢ _		_	rcester							-
1.01 to 1.25 Carbon	8.35	É		8.35	¢		(We	orcester :	=8.55¢)				_		-
WIRE® Bright	2.60	€ 2.60	É	2.60	€ 2.60	¢	_	prester				3.10			2.92
Galvanized	2.60	€ 2.60	6	2.60	€ 2.60	é		orcester				3.10			2.92
Spring	3.20	€ 3.20	É	3.20	#		(W	orcester	=3.30¢)			3.80			3.52
PILING Steel sheet	2.40	€ 2.40	É			2.40)¢					2.95	1		2.72
IRON BARS12															
Wrought single refined	4.40	i é													
Wrought double refined	5.40	14							1		1			1	

¹ Mill run sheets are 10c, per 100 lb, less than base; and primes only, 25c, above base. ² Unassorted 8-lb, coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁸ Carload lot to manufacturing trade. ¹⁹ Boxed. ¹¹ Ship plates only. ¹² Common iron bars quoted at 2.15c, by Terre Haute, Ind., producer. ²⁸ Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.

SEMI-FINISHED STEEL

	s, Blooms				
Pit	tsburgh,	Chiea	ago,	Gary,	Clev
land,	Youngsto	wn,	Buff	alo, B	irmin
ham.	Sparrows	Poin	t (r	erolling	gonly

Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher. Rerolling\$34.00 Forging quality 40.00

Shell Steel Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

		-								_			I	26	28	. (F	re	oss Ton
3	in.	to 1	2	in.										*			*		\$52.00
12	in.	to 1	18	in.				0											54.00
18	in.	and	0	ver		0	0	0	0		0	0	0						56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quan-

Sheet Bars Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Spar-rows Point, Md. Cleveland,

Per Gross To Open hearth or bessemer.....\$34.00

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md. Grooved, universal and sheared 1.90c.

Wire Rods (No. 5 to 9/32 in.)	Per Lb.
Pittsburgh, Chicago, Cleveland.	
Worcester, Mass	2.10c.
Birmingham	2.00c.
San Francisco	
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Per Gross Ton
Per Gross Ton
Massillon, Buffalo or Bethlehem\$54.00 hem

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse) Base per Lb.
High speed 67c.
Straight molybdenum 54c.
Tungsten-molybdenum57½c.
High-earbon-chromium 43c.
Oil hardening 24c.
Special carbon 22c.
Extra carbon 18c.
Regular carbon 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos- phorous	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00		
Brooklyn	27.50			28.00		
ersey City		26.03	27.53	27.03		
hiladelphia	25.84	25.34	26.84	26.34		
Bethlehem, Pa		\$24.50	\$26.00	\$25.50		
Everett, Mass		24.50	26.00	25.50		*****
wedeland, Pa		24.50	26.00	25.50	*****	
		24.50	20.00	23.30	\$29.50	*****
Steelton, Pa	25 00	24.50	20.00	25 50	29.50	****
Birdsboro, Pa	25.00		26.00	25.50	29.50	*****
Sparrows Point, Md	25.00	24.50	11111	11111	****	*****
Erie, Pa	24.00	23.50	25.00	24.50		
Neville Island, Pa	24.00	23.50	24.50	24.00		
Sharpsville, Pa.*		23.50	24.50	24.00	****	*****
Buffalo	24.00	23.00	25.00	24.50	29.50	
incinnati	24.44	24.61		25.11	*****	****
Canton, Ohio	25.39	24.89	25.89	25.39		
Mansfield, Ohio	25.94	25.44	26.44	25.94		
St. Louis	24.50	24.02	1			
hicago	24.00	23,50	24.50	24.00		\$31.
Granite City, Ill		23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00		
Hamilton, Ohio		23.50	24.30	24.00		
77 1 1	24.00	23.50	24.50	24.00	****	*****
					*****	*****
Youngstown*		23.50	24.50	- 24.00		
Detroit	24.00	23.50	24.50	24.00		*****
Lake Superior fc		*****	*****	*****	*****	\$28.00
Lyles, Tenn. fc. †		*****		*****		33.00
St. Paul			27.13			
Duluth	24.50		25.00	24.50		
Birmingham	20.38	19.00	25.00	*****		
Los Angeles	27.50					
San Francisco	27.50					
Seattle	20 00					
Provo, Utah	22.00					
Montreal		27.50		28.00		
Toronto				26.00		

GRAY FORGE IRON

Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. E. & G. Brooke Iron Co., Birdsboro, Pa., is permitted to charge \$1 in excess of maximums specified in Price Schedule No. 10.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent). Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace. Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES (Delivered Metropolitan areas, per 100 lb. See The Iron Age, Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)

ables to acceptance	o minage	our france.		10 0100 10	oios oses	1 11,0000	ATO HOUL	in conj	or munico	week D	chemate	400)	
	Pitts-		Cleve-	Phila-	New				Birm-	St.	St.	Mil-	Los
*	burgh	Chicago	land	delphia	York	Detroit	Buffalo	Boston	ingham	Louis	Paul	waukee	Angeles
Sheets, hot rolled	\$3.35	\$3.25	\$3.35	\$3.55	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.50	\$3.38	\$4.65
Sheets, cold rolled		4.10	4.05	4.05	4.60	4.30	4.30	4.68		4.24	4.90	4.23	6.85
Sheets, galvanized	4.65	4.85	4.62	5.05	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.85
Strip, hot rolled	3.60	3.60	3.50	3.51	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	5.00
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46		3.61	3.83	3.54	
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.50
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3,55	3.69	3.80	3.68	4.50
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.50
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75		7.72	7,45	7.58	9.55
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05		6.02	6.00	5.88	8.55
Bars, ed. drn. SAE 2300		8.40	8.40	8.56	8.84	8.70	8.40	8.88		8.77	8.84	8.63	10.55
Bars, ed. drn. SAE 3100.	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23		7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; Cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled sheets, 400 to 1499 lb., St. Paul. galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 00 to 1499 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.43.

WIIIIRRABIR?

EVEN A TANK NEEDS PROTECTION in Transit

lt's a blazing demon in action—but during those idle weeks or months when it's in shipment or in storage, its vital nerve centers are vulnerable to the attacks of moisture and rain, salt air and water, dirt and dust.

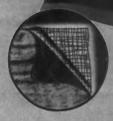
That's why motors, transmissions, generators, carburetors, radio and control equipment - and repair parts, too, must be carefully and thoroughly wrapped for shipment - from production line to assembly line, and then to the firing line.

These are only a few of the protection jobs that FIBREEN is ready to do as its part in the nation's war activity.

There is no other product quite like FIBREEN. It is a waterproof, dirtproof, reenforced paper with amazing strength and durability. It's used as a wrapping material for products of every description, size and shape.

Because of the importance of properly protecting the tremendous volume of war materials, parts and supplies now pouring from America's industrial plants, FIBREEN is being alloted to essential wartime uses for the duration.

your product comes in the "essential" classifications - if materials and methods of effective prohation in shipment are a problem — write The Sisalkraft Co. Experienced shipping experts are at your service. Explain what you make - and how you now pack it. We will try to help you.



TWO layers of crossed sisal fibers embedded in TWO layers of special asphalt—all combined under heat and pressure. FIBREEN is pliable and clean—stands an astonishing amount of abuse and exposure. Used either as a wrapping or lining material.

Sook it—twist it—icy to tear it.

Only when you get a sample in your own hands can you realize that a paper can be so strong—so tough—and impervious to moisture. There is no other material like FIBREEN. In rolls and blankers of many widths.

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. . . CONSTRUCTION AND AGRICULTURE THROUGHOUT THE WORLD





SERVING INDUSTRY.

alvanized Excep. Detroit,

\$31.34

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within eed 50c. er cent). ton for

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Los Angeles

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Semi-Fin. Hexagon Nuts U.S.S. S.A.E. 7/16 in. and smaller 64 ½ in. and smaller 62	STEEL AND WROUGHT IRO
½ in. through 1 in 60	Welded Pipe
9/16 to 1 in 59	Base Discounts, f.o.b. Pittsburgh Di
1% in. through 1½ in 57 58 1% in. and larger 56	Base Discounts, f.o.b. Pittsburgh De and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought Base Price = \$200 Per Net T
In full container lots, 10 per cent addi-	2450 11100 - 4200 101 2100 2
tional discount.	Steel (Butt Weld)
Stove bolts, packages, nuts loose 71 and 10	½ in 63½
Stove bolts in packages, with nuts	¾ in 66½
attached	1 to 3 in 681/2
attached	
	Wrought Iron (Butt Weld)
On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chi-	½ in 24
cago, New York lots of 200 lb. or over.	¾ in 30
Large Rivets	1 and 1¼ in 34
(1/2 in. and larger)	1½ in 38
Base per 100 lb.	2 in 37½
F.o.b. Pittsburgh, Cleveland, Chi-	Steel (Lap Weld)
cago, Birmingham\$3.75	2 in 61
Small Rivets	2½ and 3 in 64
(7/16 in. and smaller)	3½ to 6 in 66
For Dittahungh Clausland Chi	
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham65 and 5	Wrought Iron (Lap Weld)
	2 in 30½
Cap and Set Screws	2½ to 3½ in
Upset hex. head cap screws U.S.S.	4 in
or S.A.E. thread, 1 in. and	472 00 0 111 0272
smaller 60	Steel (Butt, extra strong, plain er
Upset set screws, cup and oval	Black
points 68	½ in 61½
Milled studs 40	% in 65½
Flat head cap screws, listed sizes 30 Filister head cap, listed sizes 46	1 to 3 in 67
Filister head cap, listed sizes 46	Wrought Iron (Same as Above)
Freight allowed up to 65c. per 100 lb.	½ in 25
based on Cleveland, Chicago or New York on lots of 200 lb. or over.	% in 31
011 1010 01 200 101 01 01011	1 to 2 in 38
WIRE PRODUCTS	
(To the trade, f.o.b. Pittsburgh, Chicago,	Steel (Lap, extra strong, plain en
(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)	Steel (Lap, extra strong, plain en 2 in 59
(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)	Steel (Lap, extra strong, plain en 2 in
(To the trade, f.o.b. Pittsburgh, Chicago,	Steel (Lap, extra strong, plain en 2 in 59
(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham) Base per Keg Standard wire nails\$2.55 Coated nails	Steel (Lap, extra strong, plain en 2 in. 59 2½ and 3 in. 63 3½ to 6 in. 66½
(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham) Base per Keg Standard wire nails\$2.55 Coated nails2.55 Cutnails, carloads3.85 Base per 100 Lb.	Steel (Lap, extra strong, plain en 2 in. 59 2½ and 3 in. 63 3½ to 6 in. 66½ Wrought Iron (Same as Above)
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(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham) Base per Keg Standard wire nails\$2.55 Coated nails	Steel (Lap, extra strong, plain en 2 in. 59 2½ and 3 in. 63 3½ to 6 in. 66½ Wrought Iron (Same as Above) 2 in. 33½
(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham) Base per Keg Standard wire nails \$2.55 Coated nails 2.55 Cutnails, carloads 3.85 Base per 100 Lb. Annealed fence wire \$3.05 Base Column Woven wire fence* 67 Fence posts (carloads) 69	Steel (Lap, extra strong, plain engle in. 59 2½ and 3 in. 63 3½ to 6 in. 66½ Wrought Iron (Same as Above) 2 in. 2½ to 4 in. 39 4½ to 6 in. 37½
(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham) Base per Keg Standard wire nails. \$2.55 Coated nails. 2.55 Cutnails, carloads 3.85 Base per 100 Lb. Annealed fence wire. \$3.05 Base Column Woven wire fence*. 67 Fence posts (carloads) 69 Single loop bale ties. 59	Steel (Lap, extra strong, plain en 2 in. 59 2½ and 3 in. 63 3½ to 6 in. 66½ Wrought Iron (Same as Above) 2 in. 33½ 2½ to 4 in. 39 4½ to 6 in. 37½ On butt weld and lap weld stee
(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham) Base per Keg Standard wire nails. \$2.55 Coated nails. 2.55 Cutnails, carloads 3.85 Base per 100 Lb. Annealed fence wire. \$3.05 Woven wire fence* 67 Fence posts (carloads) 69 Single loop bale ties. 59 Galvanized barbed wire† 70	Steel (Lap, extra strong, plain englished 2 in. 59 2½ and 3 in. 63 3½ to 6 in. 66½ Wrought Iron (Same as Above) 2 in. 33½ 2½ to 4 in. 39 4½ to 6 in. 37½ On butt weld and lap weld steejobbers are granted a discount of 5 less-than-carload shipments price
(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham) Base per Keg Standard wire nails. \$2.55 Coated nails. 2.55 Cutnails, carloads 3.85 Base per 100 Lb. Annealed fence wire. \$3.05 Base Column Woven wire fence*. 67 Fence posts (carloads) 69 Single loop bale ties. 59	Steel (Lap, extra strong, plain englished) 59 2½ and 3 in
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Cleveland, Birmingham) Standard wire nails. \$2.55 Coated nails	Steel (Lap, extra strong, plain en 2 in
Cleveland, Birmingham) Base per Keg Standard wire nails. \$2.55 Coated nails	Steel (Lap, extra strong, plain en 2 in
Cleveland, Birmingham) Standard wire nails. \$2.55 Coated nails . 2.55 Cutnails, carloads . 3.85 Base per 100 Lb. Annealed fence wire . \$3.05 Base Column Woven wire fence* . 67 Fence posts (carloads) . 69 Single loop bale ties . 59 Galvanized barbed wire† . 70 Twisted barbless wire . 70 * 15½ gage and heavier † 70 spools in carload quantities. Note: Birmingham base same on above items, except spring wire. BOILER TUBES Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall (Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots) Seamless Weld, Cold Hot Hot Drawn Rolled Rolled \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	Steel (Lap, extra strong, plain en 2 in
Cleveland, Birmingham) Base per Keg Standard wire nails. \$2.55 Coated nails	Steel (Lap, extra strong, plain en 2 in
Cleveland, Birmingham) Standard wire nails. \$2.55 Coated nails	Steel (Lap, extra strong, plain en 2 in
Cleveland, Birmingham) Standard wire nails. \$2.55 Coated nails	Steel (Lap, extra strong, plain en 2 in
Cleveland, Birmingham) Base per Keg Standard wire nails	Steel (Lap, extra strong, plain en 2 in
Cleveland, Birmingham) Standard wire nails	Steel (Lap, extra strong, plain en 2 in
Cleveland, Birmingham) Base per Keg Standard wire nails	Steel (Lap, extra strong, plain english and sin

o.b. Pittsburgh District in, Ohio, Mills only on wrought pipe) \$200 Per Net Ton

½ in	Black 63½ 66½ 68½ 68½ 24 30 34 38	Galv. 51 55 57½ 3½ 10 16 18¼
2 in	37½ 61	18
2½ and 3 in	301/2	52½ 54½ 12
2½ to 3½ in	31½ 33½ 32½ g. plain e	14 1/2 18 17
½ in	Black 61½	
Wrought Iron (Same a ½ in	25 31 38	6 12 191/4
Steel (Lap, extra strong 2 in. 2½ and 3 in. 3½ to 6 in.	59 63 66½	48½ 52½

and lap weld steel pipe ted a discount of 5%. On shipments prices are dding 25 and 30% and the rate to the base card. ces are two points lower ton higher than Pitts-on lap weld and one unt, or \$2 a ton higher 8 in. and smaller.

15½ 22½

21

N WATER PIPE

, del'd Chicago . . \$54.80 , del'd New York 52.20 , Birmingham . . 46.00 f.o.b. dock, San Los Angeles or 56.00

gas pipe, \$3 extra; 4-in. above 6-in. Prices shown less than 200 tons. For , 6-in, and larger is \$45 and \$53.80 delivered Chi-

JEL OIL

No. 3, f.o.b. Bayonne, N. J5	.20c.
No. 6, f.o.b. Bayonne, N. J3	.21c.
No. 6 Bur. Stds., del'd Chicago 4	.50c.
No. 3 distillate del'd Cleveland6	
No. 4 indus., del'd Cleveland6	
No. 6 indus., del'd Cleveland5	.00c.

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.



Loading heavy rubber sheets onto wooden pallets, carried by Baker 2000 lb. Fork Truck.

In warehouse, Baker Truck saves floor space by tiering pallet-loads two-bigh.

BAKER TRUCK cuts time 50% returns 150% on investment in one year

PEQUANOC RUBBER CO. also conserves man power

"Eight months after we placed the Baker Fork Truck in service in our plant, our savings had paid for the original investment" writes T. Mace, Superintendent of Pequanoc Rubber Co., Butler, N. J.

Rubber sheets formerly handled with four-wheel hand trucks had to be loaded and unloaded singly for storage or shipment. Today the sheets are loaded onto pallets and the Baker Truck stores the pallet loads two-high in the warehouse. When shipment is by truck, complete pallet loads are placed on wheel pallets inside the truck, which can be pushed to position in the long truck. When shipment is by freight, the Baker Truck carries pallet loads right into the box car and places them in position, two-high, so that the customer will also save time by unloading them with his power trucks.

Baker Trucks are saving time and conserving man power in a wide variety of industrial plants. Let us estimate possible savings for you.

BAKER INDUSTRIAL TRUCK DIVISION of the Baker Raulang Company 2175 WEST 25TH STREET . . CLEVELAND, OHIO



by use of wheel pallets, which can be pushed into position.



One man with Baker Truck loads box-car in less than balf the time formerly required by six men.



ON

District t pipe) Ton

Galv. 51 55 57½

31/3 10 16 181/3

49 ½ 52 ½ 54 ½

Galv. 50 1/2 54 1/2 57

481/4 521/4 56

22½
21
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5%. On
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PE Net Ton .\$54.80 k 52.20 . 46.00

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..5.20c. ..3.21c. ..4.50c. ..6.50c. ..6.00c. ..5.00c.

FFREL IA	ALLOYS	RAILS, TRACK SUPPLIES (F.o.b. Mill)
, ENNO		Standard rails, heavier than 60
Ferromanganese	Silico-Manganese	lb., gross ton\$40.0
C.o.b. New York, Philadelphia,	(Per Gross Ton, Delivered, Lump Size,	Angle bars, 100 lb 2.7
Baltimore, Mobile or New	Bulk, on Contract)	(F.o.b. Basing Points) Per Gross To
Orleans, Domestic, 80%, per	3 carbon\$113.00*	Light rails (from billets) \$40.0
gross ton (carloads)\$120.00	2.50 carbon 118.00*	Light rails (from rail steel) 39.0
	2 carbon 123.00*	Base per L
	1 carbon 133.00*	Cut spikes 3.00
piegeleisen	Other Fernalless	Screw spikes 5.15
Per Gross Ton Furnace	Other Ferroalloys	Tie plates, steel 2.15
Domestic, 19 to 21%\$36.00	Ferrotungsten, per lb. con-	Tie plates, Pacific Coast 2.30
lomestic, 26 to 28% 49.50	tained W, del'd carload\$ 2.00	Track bolts, heat treated, to
	Ferrotungsten, 100 lb. and less 2.25	railroads 5.00
	Ferrovanadium, contract, per	Track bolts, jobbers discount 63-
lectric Ferrosilicon	lb. contained V, del'd \$2.70 to \$2.90†	——— Jobbers discounter.
Per Gross Ton, Delivered Lump Size)	Ferrocolumbium, per lb. con-	Basing points, light rails—Pittsburg
0% (carload lots, bulk) \$74.50	tained Cb, f.o.b. Niagara	Chicago, Birmingham; spikes and t plates—Pittsburgh, Chicago, Portsmout Ohio, Weirton, W. Va., St. Louis, Kans
0% (ton lots, packed) 87.00	Falls, N. Y., ton lots \$2.25†	Ohio, Weirton, W. Va., St. Louis, Kans
5% (carload lots, bulk) 135.00	Ferrocarbontitanium, 15-18 Ti,	City, Minneaqua, Colo., Birmingham as
5% (ton lots, packed)151.00	7-8 C, f.o.b. furnace, carload,	Steelton Pa Ruffalo: spikes alone
	contract, net ton\$142.50	City, Minneaqua, Colo., Birmingham an Pacific Coast ports; tie plates alone Steelton, Pa., Buffalo; spikes alone Youngstown, Lebanon, Pa., Richmond, V
	Ferrocarbontitanium, 17-20 Ti,	, , , , , , , , , , , , , , , , , , , ,
ilvery Iron	3-5 C, f.o.b. furnace, carload,	FLUORSPAR
(Per Gross Ton, base 6.00 to 6.50 Si)	contract, net ton\$157.50	
	Ferrophosphorus, electric or	the day breen
O.B. Jackson, Ohio \$29.50*	blast furnace material, car-	Domestic washed gravel, 85-5
Suffalo30.75*	loads, f.o.b. Anniston, Ala.,	f.o.b. Kentucky and Illinois
For each addition 0.50% silicon add t a ton. For each 0.50% manganese over	for 18%, with \$3 unitage	mines, all rail\$25.
% add 50c. a ton. Add \$1 a ton for		Domestic, f.o.b. Ohio River land-
.75% phosphorus or over.	dale. Tenn., gross ton \$58.50	ing barges 25.
*Official OPACS price established June	Ferrophosphorus, electrolytic	No. 2 lump, 85-5 f.o.b. Kentucky
	23-26%, earlots, f.o.b. Mon-	and Illinois mines 25.
	santo (Siglo), Tenn., \$3 unit-	Foreign, 85% calcium fluoride,
P	age, freight equalized with	not over 5% Si, c.i.f. Atlantic
Sessemer Ferrosilicon	Nashville gross ton \$75.00	ports, duty paidNomin
Prices are \$1 a ton above Silvery Iron notations of comparable analysis.	Ferromolybdenum, per lb. Mo,	Domestic No. 1 ground bulk, 96
intations of comparable analysis.	f.o.b. furnace 95c.	to 98%, calcium fluoride, not
		over 2½% silicon, f.o.b. Illi-
2	Calcium molybdate, per lb.	nois and Kentucky mines\$34. As above, in bags, f.o.b. same
errochrome		
Per Lb., Contained Cr. Delivered Carlots, Lump Size, on Contract)		mines 36.
to 6 carbon	48-52 Mo, per lb. contained	DEED A CTODIES
carbon19.50c.	Mo, f.o.b. Langeloth, Pa 80c.	REFRACTORIES
carbon	Molybdenum oxide, in cans, per	(F.o.b. Works)
.10 carbon	Tot Communica Tably Trouble Table	Fire Clay Brick Per 10
.06 carbon	geloth, and Washington, Pa. 80c.	Super-duty brick, St. Louis\$64.
.00 carbon		First quality, Pennsylvania,
	*Spot prices are 35 per ton nigher.	
Spot prices are %c. per lb. of contained	*Spot prices are \$5 per ton higher. †Spot prices are 10c. per lb. of con-	Maryland Kentucky Missouri
Spot prices are %c. per lb. of contained bromium higher.	†Spot prices are 10c. per lb. of contained element higher.	Maryland, Kentucky, Missouri
Spot prices are %c. per lb. of contained hromium higher.	†Spot prices are 10c. per lb. of con-	Maryland, Kentucky, Missouri and Illinois 51.
Spot prices are %c. per lb. of contained hromium higher.	†Spot prices are 10c. per lb. of con-	Maryland, Kentucky, Missouri and Illinois
hromium higher.	†Spot prices are 10c. per lb. of contained element higher.	Maryland, Kentucky, Missouri and Illinois
hromium higher.	†Spot prices are 10c. per lb. of contained element higher.	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.)	tained element higher. RES Brazilian, 46-48 Mn67c. to 68c.	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports)	tained element higher. RES Brazilian, 46-48 Mn67c. to 68c. Cuban, 51 Mn81c.	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton	RES Brazilian, 46-48 Mn67c. to 68c. Cuban, 51 Mn81c. Per Short Ton Unit	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75	RES Brazilian, 46-48 Mn67c. to 68c. Cuban, 51 Mn81c. Per Short Ton Unit Tungsten, Chinese, Wolframite,	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.50. 4.60	RES Brazilian, 46-48 Mn67c. to 68c. Cuban, 51 Mn81c. Per Short Ton Unit Tungsten, Chinese, Wolframite, duty paid, delivered\$24 to \$26	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.50. 4.60 esaba, bessemer, 51.50 4.60	RES Brazilian, 46-48 Mn67c. to 68c. Cuban, 51 Mn81c. Per Short Ton Unit Tungsten, Chinese, Wolframite, duty paid, delivered\$24 to \$26 Tungsten, domestic scheelite, at	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.504.60 esaba, bessemer, 51.504.60	RES Brazilian, 46-48 Mn67c. to 68c. Cuban, 51 Mn81c. Per Short Ton Unit Tungsten, Chinese, Wolframite, duty paid, delivered\$24 to \$26 Tungsten, domestic scheelite, at mine\$24.00 to \$25.00	Maryland, Kentucky, Missouri and Illinois 51. First quality, New Jersey 56. Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46. Second quality, New Jersey 51. No. 1, Ohio 43. Ground fire clay, net ton 7. Silica Brick
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.504.60 esaba, bessemer, 51.504.60	RES Brazilian, 46-48 Mn67c. to 68c. Cuban, 51 Mn81c. Per Short Ton Unit Tungsten, Chinese, Wolframite, duty paid, delivered\$24 to \$26 Tungsten, domestic scheelite, at mine\$24.00 to \$25.00 Chrome ore, lump, c.i.f. Atlantic	Maryland, Kentucky, Missouri and Illinois 51. First quality, New Jersey 56. Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46. Second quality, New Jersey 51. No. 1, Ohio 43. Ground fire clay, net ton 7. Silica Brick Pennsylvania \$51. Chicago District 58.
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.504.60 esaba, bessemer, 51.504.60 esaba, non-bessemer, 51.504.5 igh phosphorus, 51.504.35	RES Brazilian, 46-48 Mn67c. to 68c. Cuban, 51 Mn81c. Per Short Ton Unit Tungsten, Chinese, Wolframite, duty paid, delivered\$24 to \$26 Tungsten, domestic scheelite, at mine\$24.00 to \$25.00 Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton;	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.504.60 esaba, bessemer, 51.504.60 esaba, non-bessemer, 51.504.5 igh phosphorus, 51.504.35 oreign Ores*	RES Brazilian, 46-48 Mn	Maryland, Kentucky, Missouri and Illinois 51. First quality, New Jersey 56. Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46. Second quality, New Jersey 51. No. 1, Ohio 43. Ground fire clay, net ton 7. Silica Brick Pennsylvania \$51. Chicago District 58. Birmingham 51. Silica cement, net ton (Eastern) 9
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chromium higher. Onke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton Id range, bessemer, 51.50	RES Brazilian, 46-48 Mn	Maryland, Kentucky, Missouri and Illinois
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ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.504.60 esaba, bessemer, 51.504.5 igh phosphorus, 51.504.35 oreign Ores* (C.i.f. Philadelphia or Baltimore, Exclusive of Duty) Per Unit frican, 46-48 Mn66.5c. to 68c. dian, 48-50 Mn68c. to 70c. Connellsville, prompt\$6.00 oundry	RES Brazilian, 46-48 Mn	Maryland, Kentucky, Missouri and Illinois
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chromium higher. Onke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton Id range, bessemer, 51.50	RES Brazilian, 46-48 Mn	Maryland, Kentucky, Missouri and Illinois 51. First quality, New Jersey 56. Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46. Second quality, New Jersey 51. No. 1, Ohio 43. Ground fire clay, net ton 7. Silica Brick Pennsylvania 551. Chicago District 58. Birmingham 51. Silica cement, net ton (Eastern) 9 Chrome Brick Per Net 12. Standard, f.o.b. Baltimore, Plymoth Meeting and Chester 54. Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54. Magnesite Brick Standard f.o.b. Baltimore and Chester 57. Chemically bonded, f.o.b. Baltimore 65. Grain Magnesite
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.504.60 esaba, bessemer, 51.504.5 igh phosphorus, 51.504.35 oreign Ores* (C.i.f. Philadelphia or Baltimore, Exclusive of Duty) Per Unit frican, 46-48 Mn66.5c. to 68c. dian, 48-50 Mn68c. to 70c. Connellsville, prompt\$6.75 to \$7.00 *Maximum by-product coke prices esblished by OPA became effective Oct. 1941. A complete schedule of the ceil.	RES Brazilian, 46-48 Mn	Maryland, Kentucky, Missouri and Illinois
chromium higher. Onke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton Id range, bessemer, 51.50\$4.75 Id range, non-bessemer, 51.504.60 esaba, bessemer, 51.504.60 esaba, non-bessemer, 51.504.45 igh phosphorus, 51.504.35 oreign Ores* (C.i.f. Philadelphia or Baltimore, Exclusive of Duty) Per Unit frican, 46-48 Mn66.5c. to 68c. Idian, 48-50 Mn66.5c. to 70c. Cournace Per Net Ton Cournace Per Net Ton Coundry Connellsville, prompt\$6.75 to \$7.00 *Maximum by-product coke prices esblished by OPA became effective Oct. 1941. A complete schedule of the cell- g prices was published in The Iron as. Sept. 25. p. 948. Maximum beehive	RES Brazilian, 46-48 Mn	Maryland, Kentucky, Missouri and Illinois
ke Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports) Per Gross Ton d range, bessemer, 51.50\$4.75 d range, non-bessemer, 51.504.60 esaba, bessemer, 51.504.60 esaba, non-bessemer, 51.504.35 igh phosphorus, 51.504.35 oreign Ores* (C.i.f. Philadelphia or Baltimore, Exclusive of Duty) Per Unit frican, 46-48 Mn66.5c, to 68c, dian, 48-50 Mn68c, to 70c. Cournace Per Net Ton Connellsville, prompt\$6.00 boundry Connellsville, prompt\$6.75 to \$7.00 *Maximum by-product coke prices es- blished by OPA became effective Oct.	RES Brazilian, 46-48 Mn	Maryland, Kentucky, Missouri and Illinois

March 26, 1942

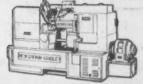
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MAR 2 7 1942

IRON AGE

D RUN G
D STOR G

IEW BRITAIN



UTOMATICS WE A FULL DAYS WORK MACHINE time lost in re-tooling,

adjustment or repairs is time donated to the enemy. As practical shop men put it, "New Britains give a full day's work" . . . and every machine we can build goes to essential war-time manufacturing, to help America win its race against time.

NEW BRITAIN-GRIDLEY • MACHINE DIVISION THE NEW BRITAIN MACHINE CO. • NEW BRITAIN, CONN



discoveries, he likely did not comprehend their full significance. When A. L. Marsh invented the series of Chromel (nickel-chromium) alloys for the fields of electric heat and pyrometry, he, too, could not foresee the extent of their value. But every passing year of the past 35 has shown the value of these Chromel alloys to home and industry. Chromel made possible most electric furnaces in use today. Thus, it placed this Hoskins laboratory furnace in the Edison Institute at Dearborn, Michigan. Chromel also has placed many Hoskins electric furnaces in the Ford factory. If you need an electric furnace for your laboratory, or for production heat-treatment, ask us for Catalog 58. . . . Hoskins Manufacturing Co., Detroit, Mich.



Our alloys are also available as heat-resisting castings. All the metals are melted by high-frequency induction, insuring purity and uniformity of analysis of the alloy. We specialize in alloys of the 35-15 type, as rolled rod or cast. If you need heat-resisting metal, tell us about it. We're sure we can help you.

HOSKINS PRODUCTS

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MARCH 26, 1942

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THE IRON AGE

MARCH 26, 1942

ESTABLISHED 1855



Let the War Wait!

Dear General MacArthur:

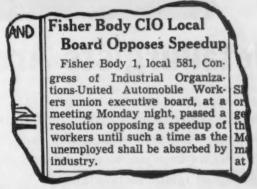
I see by the papers that you have been sent to Australia to speed things up over there. And I thought you might like to know how things are going over here in industry, since you will probably be needing some more tanks and guns, planes and shells when your speedup begins.

You will be delighted, I am sure, to know that the labor situation is perfectly satisfactory. Some people have been saying that while the labor situation has been satisfactory to labor, they thought that it perhaps would not be satisfactory to you or your \$21 per month soldier boys.

But the President last week said that Congress need not worry about the 40-hr. week or doubletime for the Sunday swing shift, or strikes or slowdowns. And since he is your Commander-in-Chief, that ought to reassure you and your American soldier boys. After all, the commander-in-chief has the final responsibility when it comes to either winning or losing a war.

The U.A.W. boys in Detroit and elsewhere are not worrying about the war either. Just last week the union bosses, in their newspaper which goes to the membership, told the brothers to "Take it Easy." So maybe you had better pass the word along to your boys, or better still to the Japs, to do the same thing. What's the use of any of us breaking our necks or old production records?

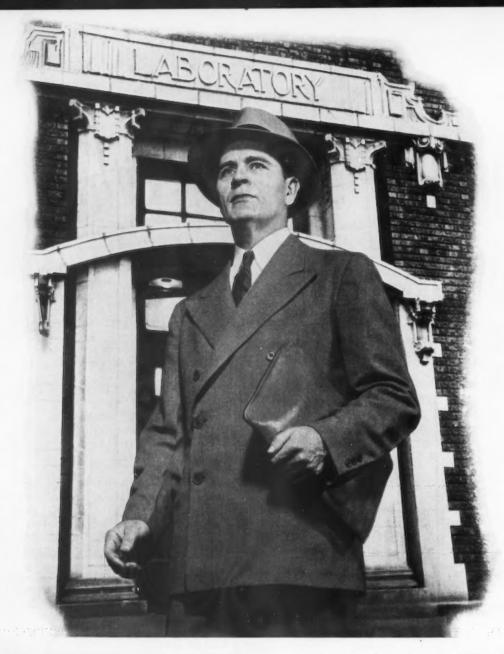
And just to clinch the case and make it watertight, here is an item that I saw last week in a newspaper in Flint, Mich. Some of your boys are probably looking for shipments of this and that from this industrial city.



So tell the boys to keep their shirts on, and everything will be all right as soon as everybody has a swell job at high pay. That is, everybody except the fellows who will do the fighting.

And perhaps too, you had better postpone any military speedup over there until all of the draftees are inducted into service. If you pass a resolution to that effect, it would be nice to send a copy of it to the CIO local 581 in Flint.

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In these critical days, when quick and specific results are imperative, America must make full use of the best it possesses in expert training and experience. That is why we urge you to take advantage of the knowledge of Inland metallurgists.

They are men with many years' experience in fine steelmaking, in applying steel to products of varied and intricate design, and in the best methods of fabrication. They are accustomed to tackling difficult jobs. Their record of success is remarkable.

Inland metallurgists do not confine their work to lab-

oratories. They have had many years of experience with the problems of metal working plants. They work with steel and make steel work for others.

Possibly you suspect there is a better or faster way of producing parts for your products. Perhaps you have a fabrication problem that is troublesome. Looking ahead, you may be thinking about the redesign of products and development of new products that will be needed for future markets.

Whatever your need, our metallurgical department is ready and anxious to serve you.

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INLAND STEEL CO.

PLATES

FIG. I—Part of one row of die casting machines. Many castings can be seen on benches where they are laid to cool, after which they are broken from gates and placed in tote boxes or passed directly to machines for flash removal.



War Applications of Aluminum Die Castings

... By installing equipment to handle die casting of aluminum parts, this manufacturer found sufficient war work to keep his plant running full time. The die casting machines and material handling equipment described herein were designed almost entirely by the company to suit individual requirements and needs.

By HERBERT CHASE
Consulting Engineer, New York

NUSUAL foresight as to needs for aluminum die castings for war uses has led the Mount Vernon Die Casting Corp., Mount Vernon, N. Y., to extend its plant and add greatly to its facilities for production along this line. This has been done without interfering with facilities for making die castings in zinc alloy for which new war applications are now being found. Dealt with here, however, are only the methods and new facilities for producing aluminum die castings. All of the latter are now produced in a new wing designed especially for the purpose and equipped for rapid and highly economical manufacture.

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There are in all 15 machines for making aluminum die castings, although a few of these are not yet ready for installation. These machines are arranged in rows along two walls, as shown in Fig. 1, with their metal pots toward the walls and the axis of the machine at right angles to the walls. Between the machines are sheet steel screens to guard against metal spitting, and steel benches on which castings are laid to cool after removal from the dies. Running parallel to the walls near the back ends of the machines are trenches covered with steel plates. In these trenches is all the piping required for hydraulic actuation of dies and goosenecks, low pressure water for die cooling, air for metal injection and gas and oil for heating. There is also a blower line feeding low pressure air to furnaces for combustion. By having all lines under floor level, space overhead is kept clear for light cranes with chain hoists to move the length of the bays above the machines. This, of course, greatly facilitates handling dies into and out of machines as well as handling goosenecks and other heavy parts of the machines that may have to be removed for servicing.

Dies are stored on heavy steel shelves in the basement below the casting floor, and the dies can be dropped through a hatch from the hoist onto a lift truck in the basement. The carrying platform of the truck can be elevated to shelf height so that dies are easily slid on and off shelves and transported by truck and crane into machines without manual lifting. This, of course, makes for rapid handling and con-

venient storage, and keeps the dies out of the way and in a storage that is fireproof but easily accessible. The storage room also provides shelter space for workmen in the event of an air raid. Separated from the storage space is a vault for electrical transformers.

Another unusual feature of the new layout is a belt conveyor that runs below the floor at one side of the pipe trench. Its function is to carry off sprues, gates and any defective castings, thus keeping the floor clear of waste accumulations. This is important because the latter are sometimes as bulky as the castings themselves. Gates are broken from the castings as rapidly as the castings cool, and the latter are deposited in barrels or tote boxes for transfer to machines for flash removal and such machining as may be required. Gates are broken off castings usually with



FIG. 2—Sprues and gates from conveyor belts are remelted and cast into ingot molds. The gates and sprues are fed into the bin along the wall from the conveyor which ends at the opening through the wall.

wooden hammers or by hand, and the gates are then thrown through an opening above the belt which carries them back to a pair of melting furnaces, as shown in Fig. 2. This avoids transporting bulky

dumping and lifting the gates and sprues into the furnaces. The belt discharges them into a high-level bin with chutes that lead to the two

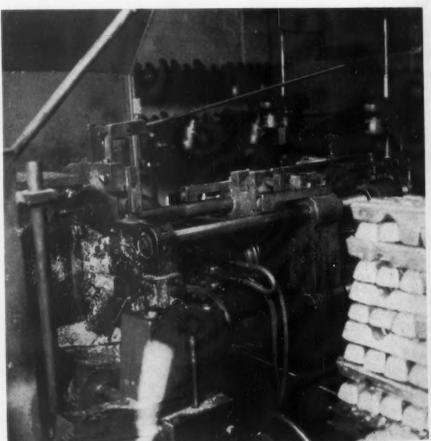
loads of gates and sprues in tote boxes, and makes unnecessary

melting pots.

Nearly all casting is done with Alcoa alloy No. 13, corresponding to ASTM alloy V, which contains 12 per cent silicon, the remainder being aluminum. A few castings are made with Alcoa alloy No. 85 (ASTM alloy VII), which contains 4 per cent copper and 5 per cent silicon, the remainder being aluminum. Each casting machine has, of course, its own melting pot and the aluminum ingots are delivered to it on skids. Machine operators feed in the already alloyed ingots as required to maintain the proper metal level in the pot. With virgin ingots are usually mixed some cast from remelted sprues and gates. The conveyor is used only for sprues and gates of No. 13 alloy. As there are relatively few gates and sprues of No. 85 alloy, they are stored and melted separately.

Each machine melting pot is

equipped, of course, with a gooseneck-shaped container having a spout which, just before the casting is made, is lifted and locked against the die. Before this, however, the gooseneck is submerged in the molten aluminum in the pot and is thereby filled to the required level. Above this level there is only a small air chamber, and when the die is closed and locked and the gooseneck is locked to it, air is admitted under a pressure of 450 lb. per sq. in. to force the metal into the die. After the die is filled, the air pressure is released and the metal pot is again lowered for refilling. In the latest Mount Vernon machine, the gooseneck is lifted and lowered automatically by hydraulic means as the dies are being closed and opened, but the toggle locking of the gooseneck is done by a hand lever. An interlock is arranged so that the injection air cannot be applied until the die and gooseneck are properly locked. Dies are opened, closed and locked by toggle mechanisms, but the toggles are operated by hydraulic cylinders actuated from a 350 lb. per sq. in.



IG. 3—Casting machine used for producing booster cups in a 14-cavity die which is shown in open position. At left is a metal pot with gooseneck submerged in molten aluminum alloy. To the right of the die is the hydraulic valve for operating ejector.



FIG. 4—Inspector breaking booster cups from their gates and feeding them to the bench at right where two operators use drill presses with end mills to face the open end of cups and remove flash. The casting machine is in the background behind the inspector.

water line pressure. Some of the dies used have hydraulically operated ejectors, but both ejector and cores are commonly operated by hand through rack and pinion. Automatically actuated slides are arranged to move some cores positively as dies are opened and closed. This is true especially on machines equipped with "unit" dies.

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Such unit dies have long been a feature of Mount Vernon equipment. Basically, they include a frame or holder in which die blocks of a standard size are quickly located and locked. In the case of aluminum casting machines, the frame usually accommodates two separate dies. When a run on one die is completed, another is quickly put in its place. It is possible to change either one or both dies, and either or both dies may have one or more than one cavity, depending upon the size and nature of the casting, core arrangement, and the like. Once in use, however, both dies are filled and operated simultaneously, and the resulting casting gate is ejected with all castings attached from both dies much as if the two dies were in the same rather than in separate pairs of die blocks. The advantage, of course, is a considerable saving in time, both of operator and machine, since a single machine handles two dies almost as rapidly as if a smaller machine with a single die were used.

Where large castings are made or where a single die with several cavities can be used to best advantage, individual rather than unit dies are employed, but machine operation remains about the same. In some cases, where parts are small and are required in large quantities, dies with a dozen or more cavities are most economical and a high production rate is attained. All of the machines, as well as the dies used by this plant, have been designed and built in the plant and embody features found well adapted to the type of work turned out.

The foregoing applies, in particular, to the gooseneck type air injection machine on which most of the aluminum alloy castings are produced. There is, however, one cold chamber, high-pressure machine of Mount Vernon design in use. Instead of using a gooseneck and air injection, this machine has a positive plunger designed to inject the metal under a 2200 lb. per sq. in. line pressure. In this, as in other cold-chamber machines, each charge has to be ladled into the injection cylinder. Before the metal can freeze, the plunger is advanced and forces the charge into the die. The high pressure results in a very dense casting, but casting production is somewhat slower than on gooseneck machines. The high pressure necessitates a large machine with heavy locking pressure and correspondingly limits the size of die that the machine can accommodate. A unit die is employed in this machine, however, and helps to boost its output of castings.

As described, bays along two walls of the new wing are given



FIG. 5—Bench with four drill presses tooled for removing flash and drilling and countersinking flange holes in the flange cylindrical castings shown.

over to casting machines. A third side is devoted to a room in which gates and sprues are remelted and cast into ingots, and the fourth side adjoins an older portion of the plant into which it opens. The remaining space in the new wing is devoted chiefly to machines for removing flash from castings and performing such light machining operations as are necessary. Most of the machines are for light drilling and tapping, but kick presses for flash removal and belt sanders

tain war jobs now about to begin, specialized tooling and tool arrangements are set up to put it through in a most efficient manner. When runs are short, only the simplest tooling is usually justified and some flash removal is even done by filing, though such work is minimized.

Typical of small parts produced in large quantities are booster cups which, in shape, resemble a pipe cap. They measure about 13/4 in. o.d. and are about 1 in. deep. They are produced 14 on a single gate,

FIG. 6—Machine in which flanged tubes are cast. The farther operator controls the machine and ejects castings after the nearer operator pulls a long vertical core by turning the pinion shaft.

for smoothing certain faces or for flash removal are also employed. The older section of the plant is equipped with lathes, punch presses, drill presses and other tools, many that are employed for work on zinc alloy, but some of these machines are used on aluminum when necessary. It is aimed, however, to keep as much of the aluminum work as possible in the new wing and most of it will be done there as new equipment is received and installed.

In this, as in most die casting shops, the jobs are constantly changing and equipment has to be adapted as well as possible to the particular jobs going through at any given time. Where unusually long runs can be made, as for ceras shown in Fig. 3, and the casting machine makes about 90 shots an hr., thus yielding 1260 castings an hr. The interior of each casting is cored out, and the gate is forced off the 14 core pins by a hydraulically operated ejector which saves much time and manual effort. Control of the ejector is through a valve moved by hand. Gates containing the 14 castings are laid on a bench to cool and are slid along to an inspector who breaks off the castings, deposits them in a barrel and throws the gate onto the belt conveyor which carrier them back to be remelted.

Next to the inspector is a bench with a pair of drill presses, each equipped with a counter bore and a quick-operating holding fixture, as shown in Fig. 4. The operator at each press feeds the cups, one at a time, into the fixture and lowers the counter bore which faces the open end, and at the same time cuts off the flash. The operator then passes the cups to another pair of larger drill presses equipped with collapsible taps which form a thread about half way down the inside diameter. Oil is supplied to the taps by a pump from a central tank after the cups are clamped, one at a time, in the lever-operated fixture. Next, the cups are placed in a punch press, being held in a fixture as the punch is lowered. The punch expands the cup very slightly, straightening the bore which has a slight draft, so that the thread gage, subsequently applied, will clear.

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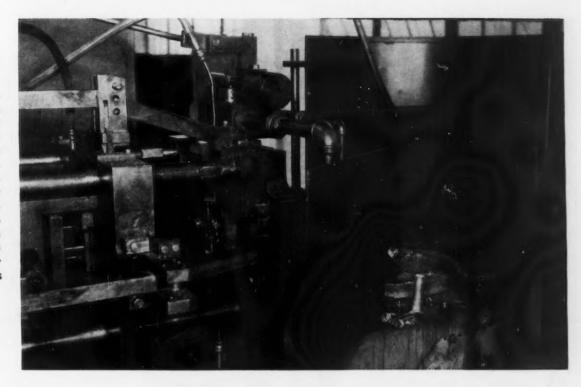
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Finally, the cups are placed on a mandrel in a light lathe and the lip is touched with a file to remove any fine burr so that the cup will pass through a gage hole. The operations are done at a rate sufficient to keep pace with the casting machine, using multiple machines when necessary. Tapping is the slowest operation and has been done at the rate of 350 pieces per hr., but a new type of tapping machine now being installed will do 600 per hr.

In contrast with this is the production of a tubular casting about 8 in. long and 2 in. in diameter, having a 3-in. flange at one end, this being one of the parts for an airport beacon. As this is a fairly large casting and requires that a long core be pulled, it is cast in a single-cavity die at the rate of 60 an hr., two men being required on the casting machine. One operates the machine and the ejector lever and the other operates the core through a rack and pinion mechanism, using a long lever on the pinion shaft to break the core free. A third man breaks off the gates and loads castings into a tote box for transfer to a bench equipped with four drill presses and suitable jigs for holding the piece while it is machined. The operations required include the removal of flash by drilling from 12 holes cored through the flange, drilling one cross hole, countersinking flange holes and facing one end. The simple fixtures required for these operations are shown in Fig. 5 and in Fig. 6, the die used for making this casting is shown in open position.

Another machine, shown in Fig.

FIG. 7—Casting machine equipped with two unit dies for producing the gate of castings seen on the furnace ledge at right. The square-section bars, running at an angle to the axis of the machine, are for operating slides and core pulls.



7, is equipped with a unit die holder in which are two dies each having two cavities. A gate with the three castings is shown on the edge of the furnace at the right of the illustration. All three castings are small, and are parts subsequently fitted to belts worn by aviators. The parts control the inflation of a belt

designed to keep the aviator afloat if he falls into water. As the machine runs at the rate of 100 shots per hr., this number of each of the three castings is produced.

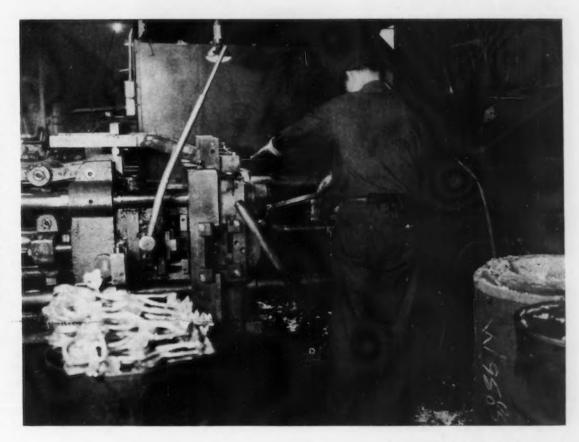
The machine used for making castings at 2200 lb. per sq. in. line pressure is shown in Fig. 8. This machine is also equipped with a

pair of unit dies, shown in closed position with the operator ladling a charge of aluminum alloy into the cold chamber. This charge is dipped from a metal pot separate from the machine, and, as soon as it is in the cold chamber, the operator throws a lever that admits oil at a pressure of 2200 lb. per sq. in. to the ram

FIG. 8—Operator pouring metal from ladle into high-pressure, cold-chamber, die casting machine equipped with a pair of unit dies. The separate melting pot for the aluminum alloy is seen at the right.

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cylinder, advancing the ram and forcing the charge into the die. The metal is kept close to its melting point and, when injected, is really in a semi-molten condition. In all cases, to insure complete filling in of the die, the charge ladled in is somewhat greater than sufficient to fill the die cavities and gate passages. Also filled is a slug space at the end of the ram, this space holding the excess charge.

When the castings solidify, the dies are opened and the ram forces the slug out of the recess in which it is formed and it is ejected as a

part of and along with the gate of castings. The ram has a diameter of 2 in. but is advanced by a piston of larger diameter. This larger diameter of the piston, of course, multiplies the pressure applied to the metal in contact with the ram. Dies are toggle operated by a ram on a 350-lb. line as in the other machines described. Production in this machine, used chiefly for casting instrument parts, runs about 75 shots per hr. but, as there are two dies and each may have more than one cavity, several castings are often produced in each shot. Cast-

ings, still on the gate, are placed in tote boxes or barrels, transferred to an inspection bench where they are broken from the gate, and defective castings are rejected. The machining operations that follow remove flash and cut away such excess metal as may be required on the particular castings involved.

The new plant is well arranged for rapid production. This applies not only to the casting operations, but to subsequent machining as well as to the handling of metal, gates and sprues and to moving dies into and out of machines.

Self-Compensating Welder for Plate

A WELDER in which the temperature at the weld itself automatically controls weld current and operating cycle, and which is completely self-compensating for variations such as normal differences in metal thickness, work induction and short circuiting losses, presence of scale and similar variables, has been introduced by Progressive Welder Co., Detroit.

Designed for resistance welding of heavy sections and of special alloy steels such as homogeneous and face hardened armor plate and for shipbuilding, the new Temp-A-Trol forge welder both spot welds and heat treats the weld. Close control of weld nugget size, ductility and grain refinement are thus obtained. It is also said to avoid annealing of hardened surfaces on the plate.

Completely automatic control of



weld, heat treat and annealing cycles reduces the human element to a setting of the dials to the

actual temperatures desired. Another advantage of controlling welding current and cycle through weld temperature rather than by the conventional manual setting of current and time regulating controls is that it provides automatic compensation for current loss due to varying amounts of work introduced in the throat of the machine. Increases in plate thickness increase current losses due to induction, causing a variation in the actual amount of welding current which is almost impossible to compensate for accurately by manual means.

Current loss through adjacent completed welds, caused by short circuiting of part of the welding current through these points affects the size of the weld nugget, but is no longer a problem because current is automatically increased to compensate for the loss.

Crack Formations in Steel

A STUDY of the effect of inclusions and segregations on the tendency of steels to form hairlike cracks was made by E. Houdremont and H. Schrader in a recent issue of Stahl und Eisen. Sulphidic inclusions have very little effect, whereas oxidic inclusions sometimes enhance the formation of such cracks. It is believed that this is the result of the hydrogen contained in these inclusions and liberated at high temperatures.

Segregated zones were found to behave like the surrounding materials. Some information is also given on the effect of the alloy composition on the liability of steel to hair-line crack formation, and the possible causes of this effect are discussed.

Investigations were made as to the effect of annealing in atmospheres containing either hydrogen compounds or hydrogen diluted with other gases, such as exhaust, illuminating, ammonia, water vapor, and other gases developed by case-hardening compounds. It was determined that as much hydrogen is taken up from these atmospheres as from pure gas. With the limited annealing periods usual in commercial practices, however, it is pointed out that there is no danger of excessive absorption of hydrogen by articles of large dimensions.

Cutting Tools Tipped With High Speed Steel

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TITH all types of high speed steel highly restricted and with some types difficult even for holders of high priority ratings to obtain in the quantities they desire, it is not surprising that attempts should be made to use high speed steel in the form of tips on tool steel or low alloy steel shanks. During the last war, the Germans were known to have used H.S.S. in tip form by the butt welding process, but except in the case of twist drills, attempts to resistance weld high speed steel to carbon steel shanks have not been successful. (In 1938, the German Reich ruled out the use of high speed steel for cutters, forcing manufacturers to use cemented carbides almost 100

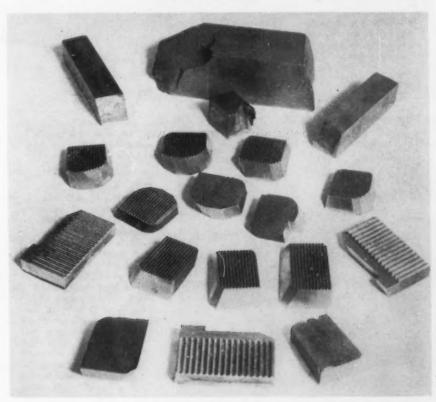
In the past year, Leo J. St. Clair, president of the General Tool & Die Corp., East Orange, N. J., developed two new processes of tipping tools with hardened high speed steel that have worked out successfully and are being widely used. Patents have been applied for on the processes, but until they are granted, complete disclosure of the processes cannot be made. In essence, one process consists in brazing hardened high speed steel tips to shank steel without affecting the hardness of the tip; the other combines a form of arc welding, without cracking of the weld metal upon cooling or softening the high speed steel tip.

A special solder is used as the

braze material and it is the presence of this material between the hardened tip and the shank that makes such composite tools resilient —a factor that adds to their life. Such tipped tools will outperform solid high speed steel tools two to one on applications involving intermittent cuts, according to Mr. St. Clair. The braze is strong, and attempts to hammer off the tip result only in chipping of the hard tip.

Retaining the original hardness

FIG. 1—Worn out "OK" and Apex milling cutter blades and broken pieces of high speed steel that are used for tipping various tools and cutters. This practice makes possible the continued use of the high cobalt high speed steels as long as scrap tools can be drawn up.



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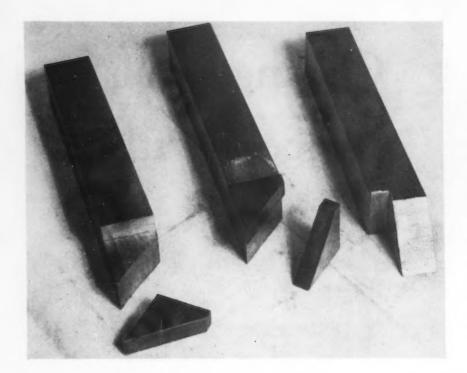
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of the tips means that various scrap tools like serrated back milling cutter inserts and broken square bits, Fig. 1, can be used to make new tools without subsequent heattreatment. If on the other hand through faulty control of procedure the tip is annealed in the process of brazing it to the shank, the temperature required to harden the high speed steel tip tends to weaken the shank material due to excessive grain growth. Hence it is essential that the original hardness be retained. Hardened scrap material is cut to the required size with an abrasive cut-off disk, either dry or wet.

An important aspect of these two new processes is that they make it possible to continue to provide medium and high cobalt high speed steel tipped tools to users who send in such scrap material for tipping.

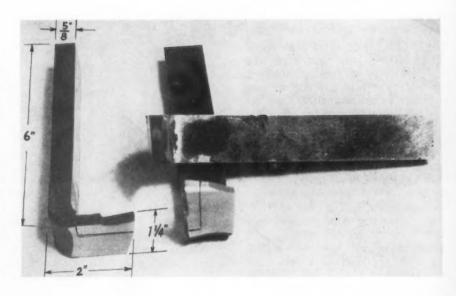
ABOVE

FIG. 2—The tips of these I x I x 5 in. tools are made of scrap Gray Cut cobalt high speed steel and weigh ¾ oz. each. The solid H.S.S. tools weighed II/2 Ib. The tipped tools produced 50 per cent more than the solid I x I-in. tools because of the resilient construction.



RIGHT

FIG. 3—This bent shank recessing tool was originally forged out of a solid H.S.S. flat bar of 1 x ½ in. cross-section. The tool shown, which is used in a P & J automatic, has a ¼ x ¼ x 1¼ in. tip cut from ¼ in. hardened square bits with an abrasive disk.



LEFT

FIG. 4—A form tool like this is ordinarily very wasteful of valuable high speed steel. Although the shank is 1 x 1 in. in section, the tool must be formed out of a 1 x 1½ x 6 in. piece of H.S.S. or one with a bent shank. The H.S.S. tip shown here is only 3% x 3% x ½ in. The shank material is SAE 2340 or 1040.

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One manufacturer, for instance. formerly used a number of solid 3/4 x 11/4 x 8 in., 8 per cent cobalt H.S.S. tools. When these are ground back to a length of 5 in., they are too short for further use. These short shanks are now cut up into 12 wafers 3/8 x 3/4 x 11/4 in. which are used to tip a dozen 8-in. low alloy tool steel shanks. Had this manufacturer, who cannot buy any more 8 per cent cobalt steel, been obliged to turn to either regular 18-4-1 high speed steel or the balanced tungsten-molybdenum variety, cutting speeds would have to be reduced 30 per cent.

Figs. 2, 3 and 4 illustrate ex-

54-THE IRON AGE, March 26, 1942

amples of conversion of solid to tipped tools.

Delivery of tools has been expedited in many cases through the use of these tipping processes because it otherwise takes as much as six months to obtain delivery of certain sizes of high speed steel shanks under present war conditions.

Mr. St. Clair feels that certain types of tipped high speed steel tools will be popular even after the present shortage of H.S.S. no longer exists because of the cheaper and often stronger tools produced by the tipping processes, and also the longer life frequently secured with the tipped tool. A notable example is dovetail forming tools. In many instances, such form tools have broken on initial use due to hardening strains set up in the sharp corners of the dovetails. When a hardened high speed steel tip is arc welded to a low alloy. unhardened steel dovetail, breakage never occurs in the dovetail and the combination brazing and welding process provides a resiliency to the tipped tool that the solid tool lacks. Generally only 50 per cent of a solid tool can be used for cutting, the remainder being required for clamping. For this application stub ends of dovetail H.S.S. form tools that have become too short to hold securely or broken tools are used to build up the composite tools. A large number of broken or scrap dovetail form tools for shell turning are being put back into service quickly by the tipping process, as shown in Fig. 5.

Another example of a tipped tool that is giving more satisfactory performance than its solid H.S.S. prototype is the large fishtail boring tools shown in Figs. 6 and 7. These tools when made solid often broke from hardening strains, whereas the tipped tools have yet to break. One such fishtail tool uses a piece of high speed steel, 11/4 in. thick, 4 in. wide and 6 in. long, weighing about 9 lb. Now two tips, 3/16 in. thick, 3/4 in. wide and 1 in. long are used, weighing about 2 oz. By tipping this tool, a saving of 8 lb., 14 oz. of high speed steel results and a stronger tool is made.

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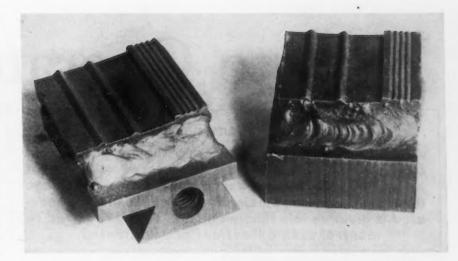


FIG. 5—Two band grooving tools for 75 mm. shells, with $1/2 \times 11/2 \times 2$ in. high speed steel sections are welded to a carbon steel dovetail. Formerly such tools were made of solid H.S.S., $1\frac{3}{4} \times 2\frac{1}{8} \times 2\frac{1}{2}$ in. in section and were subject to frequent breakage in the dovetails. The solid tool cost \$45; the welded composite one, \$25.

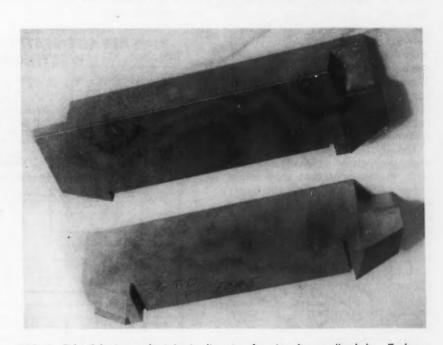
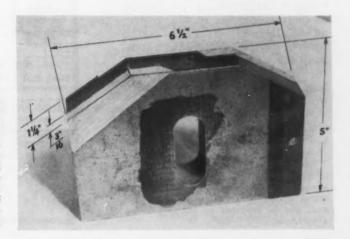


FIG. 6—Fishtail boring tools, 6 in. in diameter, for aircraft propeller hubs. Tools are tipped with worn out "OK" milling cutter blades. When made from solid high speed steel stock, these cutters often broke. Brazing H.S.S. tips on alloy steel bars has eliminated this breakage. Cost of solid tool, \$26.10; of tipped tool, \$19.75.

RIGHT

FIG. 7—High speed steel tipped fishtail boring tool. Weight of two tips, 3 oz.; weight of solid H.S.S. tool, 11 lb. Due to heat-treating strains, the solid tool used to break quite often, but this breakage has been eliminated in the tipped tool. Price of solid tool, \$54.50; of tipped tool, \$40.85.



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How to Operate Salvage

Reclamation and Conservation of Metals

... This is No. 2 of a series of articles designed to aid industry obtain the utmost value from every pound of metal. A step-by-step description of how a salvage department can be efficiently and economically operated is given in this timely article. Forms required to control such operations are illustrated.

PROBLEMS faced in organizing for effective salvage operations are almost infinite and require much attention and experience if they are to be efficiently and economically overcome. Over the past few years the many details of salvage operations have been thoroughly studied by Westinghouse Electric & Mfg. Co., putting the company in a position to take effective steps toward counteracting the current shortage of many scrap materials.

Details of the Westinghouse salvage procedures are outlined here with the thought that they might serve as a guide to plants newly facing the problem of developing reclamation divisions. The procedures described here are amenable to substantial alteration to fit the requirements of specific plants, without suffering the loss of the thread of control which must be maintained intact from start to finish if the operation is to be effective.

The responsibility of a salvage department is to plan and supervise the physical handling of materials worthy of reclaiming and to outline the most economical procedures involved in refabricating or disposing of the material for reuse. Nearly all of the problems of salvaging operation are encountered in a company the size of Westinghouse and the time given to their solution has been found very much worth while.

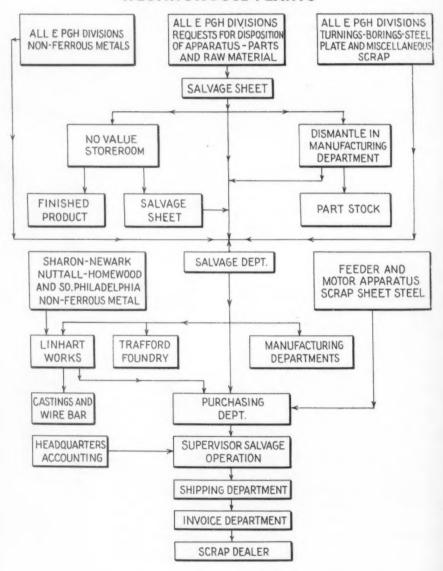
When any apparatus, parts or material amounting to more than \$10* are found to be surplus from

causes other than cancellation of orders, it is reported on a salvage sheet, Fig. 1, by the production clerk or storekeeper in charge of the specified item. The procedure followed when authorizing materials or parts to be scrapped is as follows:

(1) After the top half of the salvage sheet, Fig. 1, printed in hectograph, has been completely filled in and signed, the original is sent to the disposition department, the originator retaining a carbon copy for his files.

(2) The disposition department, after making the necessary investigation to determine usability, fills in the middle half of the salvage sheet, obtains the required signa-

SALVAGE MATERIAL FLOW SHEET FOR WESTINGHOUSE PLANTS



^{*}An item of surplus not exceeding \$10 in value which is definitely known to be unusable may be disposed of on authorization of the production supervisor and need not be reported to the disposition department.

Departments

By RAY SCHMIDT

Supervisor, Reclamation and Salvage Dept., Westinghouse Electric & Mfg. Co., East Pittsburgh

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tures according to the value involved, and distributes copies to the production cost and the salvage departments. The original is retained by the disposition department.

(3) Upon receipt of its copies, the production department writes a salvage tag for each item showing the authorizing salvage sheet number and item. The corresponding salvage tag number is entered on the salvage sheet.

(4) When all items have been

sent to the salvage department, a copy is stamped "completed" and sent to the cost department to be matched with its copy.

(5) As each item is received and disposed of in the salvage department and credit given by means of the salvage tag, the transaction is noted on the salvage department's copy of the salvage sheet.

(6) As the credit for each item is received in the sending division, the cost department makes the entry on its copy of the salvage sheet.

The procedure followed when parts are dismantled is as follows:

(1) Five copies of salvage sheet, Fig. 1, are made out by the disposition department and distributed to the production and the cost department and one to the section that is to dismantle the apparatus. This latter may be a manufacturing section or the salvage department, depending on the apparatus. The original is retained by the disposition department.

(2) If the material is dismantled in the manufacturing department, the production department makes out the form shown in Fig. 2 and forwards this to the division accounting department to be matched with its copy of the salvage sheet.

(3) Each transaction is also recorded on the salvage sheet and completed as outlined under procedure for scrapping surplus material.

When it is determined by the shop that materials are no longer required due to obsolescence, spoiled work, or engineering and sales authorization due to design or other changes, a salvage tag, Fig. 3, is issued showing the kind and amount of material, section sending it, and the order number to which the loss should be charged. This form is signed by four authorized persons of the shop-the inspector, foreman, production clerk, and accountant. The weight or count is verified by an inspector and the cost representative, except in certain cases where it is not economical or where it is physically impossible.

Authorized exceptions to this procedure are low grade metals such as tin and terne, bulky miscellaneous iron and steel, extra large castings and cubicles, and similar materials which cannot be weighed on shop scales. On such items shop weights are accepted and credit allowed on that basis. However, in carload lots returned from the shop, such as steel turnings and plate scrap, the weights are verified by the yardmaster's scales. Salvage tags showing the

FIG. I.—Filling out this form starts material to the salvage department.

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grade of material received and the amount of credit allowed are turned over to the factory service cost division. They are priced in line with a general classification of the various materials established by the accounting department.

Non-Ferrous Scrap

In a salvage storage building at the East Pittsburgh works there is accumulated each month approximately 800,000 lb. of non-ferrous metals, chiefly aluminum, copper, brass, bronze and alloys. These are checked, weighed, graded in the salvage department and credits allowed to the sending sections in line with the accounting department's established credits.

A new salvage tag for the accumulation of each grade is then made by the salvage department and the material reshipped to the Westinghouse Linhart works where

A description of some of the reclamation methods used at the Linhart works is given in the article "Reclaiming Metal Scrap," The Iron Age, Jan. 29, 1942, p. 41.

it is made into alloy castings, copper straps, or ingots for production of many Westinghouse products.

Sales of Ferrous Scrap

Scrap accumulated in the bins is shipped out at regular intervals to dealers who have contracts with the purchasing department and is allocated to steel manufacturers. Orders are issued and prices arranged on a monthly basis depending on the scrap market and ceiling prices. Monthly shipments under this arrangement total around 5,000,000

FIG. 2—Material salvaged by dismantling is described on this form.

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FIG. 3—Shop materials are salvaged by use of this tag.

lb. a month. Also accumulated from time to time are some grades which are not on contract, and these are likewise sold through the purchasing department on a negotiated basis. All outgoing scrap is weighed.

Grades of Scrap

Many reclaimed materials cannot be shipped at once and are temporarily stored in salvage storage buildings. The general classifications of this material are:

(1) Those requiring labor to dismantle, including torching and shearing to smaller sizes, and (2) straight scrap unloaded directly into bins.

The bulk of the scrap handled at the salvage storage building consists of ferrous metals graded as follows: No. 1 heavy melting scrap; No. 2 melting scrap; miscellaneous iron and steel scrap; steel turnings; mixed steel borings and turnings (clean); mixed steel borings and turnings (dirty); and low phosphorus plate scrap.

The turnings, borings, and tin and terne plate scrap are unloaded directly into large bins. Miscellaneous iron and steel and the melting scrap are also sorted and placed in the proper bin. Thus, approximately 30 per cent of the miscellaneous steel valued at about \$16.50 a ton is converted by this sorting and shearing into No. 1 and No. 2 scrap worth \$20 a ton. There are several other grades accumulated from time to time at a lower volume such as No. 1 cupola cast, which is delivered to the Westinghouse foundry. Approximately half of this No. 1 cupola grade is converted from heavy cast iron by the magnet-and-ball method.

At the end of each month the cost department issues a report in detail showing all of the issues from the scrap house, whether sold direct to dealers, or returned to the shop for use. This shows items such as cupola cast iron to the foundry. shredded paper to the shipper, boxes and crates to other Westinghouse works, drums reclaimed by cleaning, sawdust to the shippers, etc.

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No-Value Surpluses

When placing materials in "No-Value" storerooms, the procedure described below is followed by the disposition department. There are four sources for reporting surplus materials to be placed in the novalue storerooms. These are: (1) Surplus materials due to reduced or cancelled orders; (2) surplus materials due to errors in ordering and minor changes made by the engineer: (3) material returned by the customers on Returned Material Reports, and (4) inactive stores stock.

The procedure followed by the disposition department is the same in each of the above sources, except different forms are used for reporting surplus materials.

The disposition department goes through the following procedure when handling surplus materials from cancelled and reduced orders: (1) The disposition clerk secures drawings and refers them to the engineer to find out if materials should be held in no-value storerooms to be applied to future orders or should be scrapped at once, and (2) in case materials are to be held in no-value storerooms, a salvage sheet is written up by the disposition department and distributed

after required signatures are secured.

Five copies of the salvage sheet, Fig. 1, are made out in the disposition department authorizing the material to be depreciated to no-value and to be held in the novalue storeroom. These salvage sheets list the exact location of the material and the storeroom to which the material is to be sent; also the value of the material and the proper account number to which the tach to material for identification. Envelopes, Fig. 6, are filed in style record files or pattern files in the manufacturing information division. If material has no style number, an envelope, Fig. 6, is made out and filed in the manufacturing information division's bill of material files. A tickler card is made out for filing in the disposition department and for their record. Surplus material due to errors in ordering or minor changes by engineers,

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IG. 4—This rec-	SURPLUS STOC			STYLE		
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material is to be charged. Copies of the salvage sheet are distributed to the cost department and the production department, with the original copy held for file in the disposition department.

In addition to making out the salvage sheets for no-value materials, the disposition department makes out additional forms. One copy of the surplus stock record card, Fig. 4, is sent to the storekeeper for file in storeroom ledgers. One copy of surplus stock tag, Fig. 5 is sent to the storekeeper to ator surplus materials accumulated through other sources then reduced or cancelled orders, are handled the same as described above under returned material requisitions, except that the request for disposition is originated in the shop sections. Surplus materials returned by the customers on a returned material report are handled in practically the same manner except it is first handled by appointed persons in the various accounting departments and, after proper disposition has been decided upon, are sent to the

IG. 6—If the item has no	SURPLUS MATERIA		O NOT R	RN ENVELOPE TO S	ERIAL FRO		NVELOPE, EXCEPT ROUTING WHEN A	FOR CHANGE	E OF SUE	PLIED,		
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As the materials are being used from the no-value storerooms, the storekeepers send in one copy of a material or storeroom requisition to the disposition department in order to keep all records up-to-date.

When all the surplus materials are used, the storekeeper returns the surplus stock record card, Fig. 4, to the disposition department and all records are removed from the manufacturing information division files. Also, as the no-value materials are being ordered when manufacturing information is being written, the information clerk automatically reduces the quantities available on the envelopes, Fig. 6, filed in the manufacturing information division files.

When it is desired to place a regular stores item in the no-value storeroom, the following procedure is required: (1) All material of the style involved is returned from stock floors; (2) stock is inventoried and proper adjustments of quantities made on the store's inventory form, and (3) a request for a disposition and salvage sheet is instituted by the division storekeeper and is sent to the disposition department.

If, after placing material of any kind in no-value storeroom by means of the procedures described above, it becomes desirable to scrap because of lack of activity, the production department requests disposition again on the form shown in Fig. 1, and the procedure is followed as when scrap is authorized.

Scrap Pricing Methods

Over the years, Westinghouse has had considerable experience in disposing of the company's scrap and has found that the types of scrap which accumulate at regular inter-

vals can best be disposed of by a contract arrangement with a reliable broker or user. Lots that come along at irregular intervals are simply disposed of as reported.

The following are the items disposed of by yearly contract:

> Heavy melting steel Low silicon compressed scrap High silicon compressed scrap Miscellaneous iron and steel scrap Clean cast iron borings Dirty mixed borings and turnings Clean mixed borings and turnings Tin and terne coated mixed scrap No. 2 melting steel scrap Low phosphorus plate Machine shop turnings

The sale price of all these materials is related to the published price as given in THE IRON AGE in the last issue of each month, or ceiling prices established by O.P.A. This published figure is used as a basis for determining the selling price for all scrap shipped during the succeeding month. No. 1 heavy melting steel is used as a basis because the price is very sensitive and the published price is truly representative of the actual value of this THE IRON AGE prices are grade. quoted delivered and the differential arranged for in our various contracts allow for freight and profit to the buyer.

Examples of this type of arrangement are as follows: Low phosphorus plate scrap, which is the company's highest grade of steel scrap, is sold at the mean published price of No. 1 heavy melting scrap, plus 15 per cent. Tin and terne coated miscellaneous scrap, which is the company's lowest grade, is sold at the mean published price of No. 1 heavy melting steel, less 70 per cent.

All scrap is shipped and billed on orders entered by the purchasing

department, most of the scrap being sold on the basis of cash in advance. For suppliers with whom we have contracts, it is necessary for the purchasing department to keep a ledger record of deposits, charges and cash balances. Whenever a car is ready to load, the purchasing department is notified, the supplier is checked as to destination and the cash balance is inspected to ascertain that there is enough cash on deposit to cover the shipment. When this is cleared the salvage department is notified to proceed with loading and the car shipped.

Some idea of the magnitude of scrap sales may be obtained from the following excerpts from a recent East Pittsburgh purchasing department annual reports, showing scrap sales for 1941:

Iron and steel scrap... 49.918.000 lb. 9.652,000 lb. Non-ferrous scrap 928,000 lb. Miscellaneous scrap 60,498,000 lb.

In connection with scrap sales, gains or losses are calculated as the difference between sales prices and the average monthly prices for each grade as published in the leading journals for the ferrous, non-ferrous and waste material industries.

Obsolete and surplus materials reported to the purchasing department theoretically may be disposed of to best advantage of the original manufacturer. Sometimes the material may be of interest to others and sometimes there is no outlet whatever except to turn the material over to the salvage department to be disposed of as scrap and there converted to standard grades as described above.

Salvaging With Vacuum

BABBITT dust, gold dust, fluxes, precious industrial metals, graphite, solder, enamel, alloy grindings, borings and bolts and nuts are among the numerous materials now being salvaged as routine operations by use of vacuum in numerous industrial plants.

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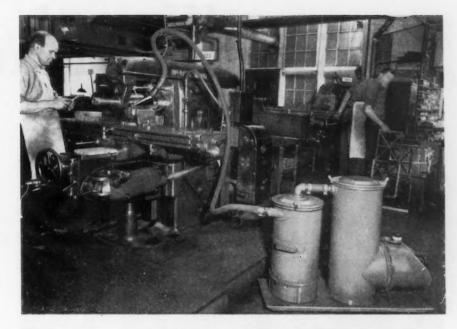
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With industry striving to stretch out available supplies of raw material as much as possible, many sources of potential savings through reclamation by use of vacuum are yet untouched, according to R. A. Brackett of the Spencer Turbine Co., Hartford, Conn. In addition to the elimination of health hazards, and the indirect effect of this upon insurance costs, many vacuum reclamation units are reported paying out in dollars and cents through the resale or reuse value of the reclaimed material.

Another factor now being taken into consideration in the installation of vacuum reclamation units is that of making the salvaging activity an integral part of a production operation, Mr. Brackett reports. Typical of this trend is the installation in an automotive plant where a vacuum unit not only salvages pure babbitt from a machining operation at the rate of 1000 lb. a day, but also serves to clean the engine block in preparation for the next operation on the assembly line. Another example of this



THIS Spencer vacuum unit is attached to a milling machine to salvage chips. Mounting the unit on a skid, as in this illustration, makes it possible to use one machine for a number of intermittent operations.

nature is the utilization of vacuum for removing lead shot and sand used for cleaning from the interior of a ship before painting. Some manufacturers of metal working equipment are designing vacuum equipment into their machines as original equipment.

One of the outstanding features of a vacuum unit is its flexibility. It may be portable or fixed, its distance from the point of collection can vary widely, it may be installed as part of an assembly line and it can handle a wide assortment of material.

While the economics of any salvaging operation depend in a large measure upon the quantity of material susceptible to reclamation, the use of several small vacuum units, each for a specific type of material, often provides an advantage over larger reclaiming equipment which

must treat material in mixed bulk quantities.

Thus it is possible to segregate the grindings, for instance, of a bronze working machine from those created by a steel working machine. With proper design, it is possible to effect 100 per cent reclamation of excess and scrap material on a production scale.

Vacuum units are available in sizes as small as $7\frac{1}{2}$ hp., lending themselves admirably to mounting on skids or for movement by crane or other readily available transport facilities. Central installations find economical use where one material is to be reclaimed from many sources. Tools for use with vacuum equipment are made with brush ends that simplify collecting fine powders and dust which must be loosened before they can be removed.

Simple Metal Cleaning Check

THERE are a number of simple tests that can be made in even the smallest shops to determine the chemical cleanliness of metal parts that are subject to further processing, such as enameling, plating, galvanizing, and tinning. The simplest of these tests on cleaned iron castings, forgings, steel sheets except stainless, etc., is to paint the material with a saturated solution of copper sulphate to which about

2 per cent of sulphuric acid has been added. This procedure serves to detect the presence of iron or iron alloys, by forming a bright yellow copper coating on the surface of the article. When sand, iron oxide, or other foreign material is present, the test piece will maintain its original color or be blackened slightly. Special emphasis should be given to fillets and cavities in the piece.

In checking the cleanliness of a complete batch in a cleaning machine, it is advisable to test pieces from various parts of the load to make certain the entire load is cleaned. In an abrasive blast cleaning process, it is a simple matter to determine when all pieces of a load in a Wheelabrator Tumblast are evenly cleaned by stopping the machine and making this test on several pieces.

Material Handling at S

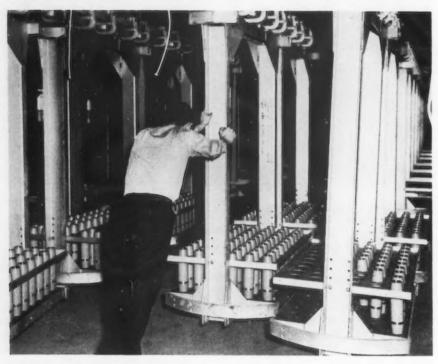


FIG. I—Shells are allowed to dry on monorail dollies such as these after being painted by an automatic paint spray.

FIG. 2—Molten TNT (trinitrotoluene) is poured from these rubber buckets into the shells while they are still on the conveyor. The molten explosive then solidifies, and the shell can be handled with ease.

... Because of the expansional aid of conveyor lines, railoadi enlisted to haul materials both aid is the Auto-Railer, use

MAJOR problem in material handling arises from the physical layout and operating methods that are necessarily employed in plant loading and assembling explosive shells and bombs. These loading plants are laid out with the principle of keeping the explosives dispersed over as great an area as possible in specially constructed storage buildings. The operating part of the plant is an assembly department known as the "load line." It is to this load line that it is necessary to provide a steady, uninterrupted flow of materials, including mechanical parts and explosives.

Equipment employed to facilitate material handling in these loading plants includes a special type of motor vehicle capable of operating on roadway or standard gage rail. This vehicle, called the Evans Auto-Railer, is the result of engineering development under the direction of E. S. Evans, president of Evans Products Co., Detroit, and its adoption is particularly suggestive of other possible applications in the industrial field. While wartime production has gained much from the study of the methods and equipment of peacetime industry, this appears to be one instance in which peacetime industry may pick up a particularly useful suggestion to facilitate its "yard operations" and possibly to increase efficiency in some plant operations. Inter-plant hauling possibilities also are apparent.

One of the plants of the United States Army Ordnance Department is operated for the government by a large powder company. It is an example of the most modern American shell loading plant. Layout of the plant is made on the engineering assumption that any

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shell Loading Plants

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By W. F. SHERMAN
Detroit Editor, The Iron Age

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specified quantity of stored explosives has a specific destructive power. The plant stores these explosives in restricted quantities in magazine buildings or igloos, each structure being separated from the others by a known safe distance. The ordnance plant itself and its adjoining depot cover an area of 40 sq. mi., making it undoubtedly one of the largest plant areas in the world. Every square foot of the 40 sq. mi, is not covered with factory buildings or storage buildings, but every useful square foot is either occupied by a building or is serving as a safety area between buildings, and no other structures are to be erected in the safety areas.

This mammoth plant is literally carved out of the country-side, including parts of two counties within its Cyclone fence protection. It can easily be construed as obtaining camouflage value from the natural features of rolling farmlands which have been untouched during the erection of the various buildings for storage, manufacture and assembly.

Equipping such a plant as this for efficient operation has become a major assignment in the United States, with some 50 such plants either projected or now in existence.

The operation of these 50 plants will probably follow along lines similar to those employed at this plant. The ordnance plant receives from various private contractors,

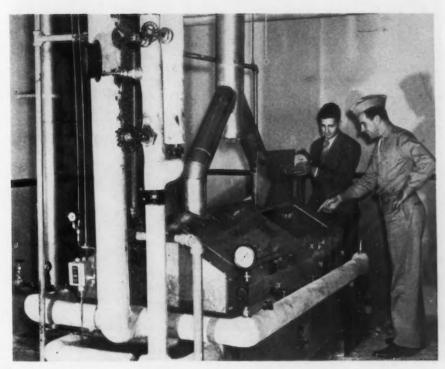


FIG. 3—Seldom seen by those outside a loading plant is this large unit in which TNT is melted. There are several such units at this plant.

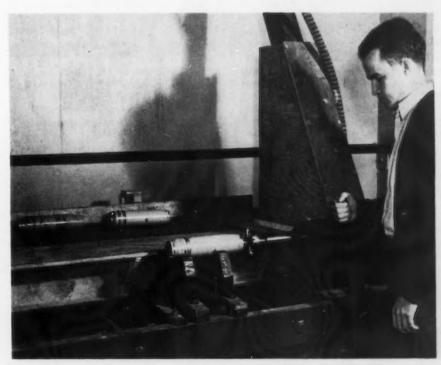


FIG. 4—A booster cavity is drilled in the hardened TNT, one of the "surprise" operations to the layman. The work is done on a machine similar to those used in metal working industries.

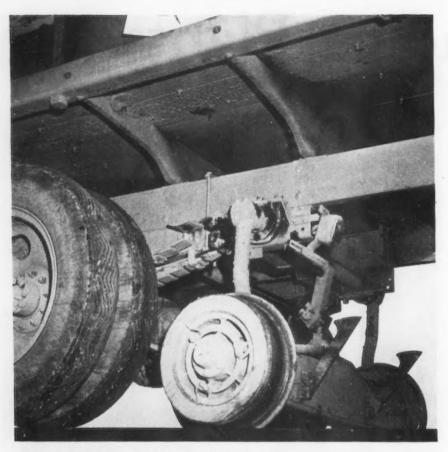


FIG. 5—This close-up shows the flanged wheels and retracting mechanism of the Auto-Railer, the rail-truck used both on standard gage rails and on roadways with equal facility.

or from the government arsenals, the materials which, properly assembled, constitute an explosive shell or bomb. These materials include the explosives, fuses, primers, boosters, shell or bomb cases and cartridge cases. Each type of material is stored in suitable, specially designed buildings. From these buildings they are scheduled for movement to the loading station where they are assembled and inspected, prepared for storage and finally delivered to the depot area, pending final shipment to the armed forces.

In addition to the shell loading lines, there are certain other sta-



FIG. 6—Auto-Railer locomotives are used as switching engines and on long hauls over the 123 mi. of track in the ordnance plant area, and can be driven off the rails with ease.

tions for assembling detonators. percussion elements, fuses, boosters and primers.

This description helps to visualize the problem of material handling. Obviously, it is not one to be solved by the use of conveyors. First of all, the hundreds of miles of conveyors which would be necessary to link the various sources of supply with the assembly areas would be a highly complicated and expensive system. Moreover, it would lack the flexibility that is demanded. finally, the actual physical linking of the various sources of supply with the assembly areas is not desired, since it is objectionable to link one danger area with another.

Materials are brought into the ordnance area from outside suppliers by rail. On arrival they are inspected and then stored until needed on the load line. Because of the danger of having accumulations of the explosive materials in the load line area, no surplus is permitted in this area, and only required quantities are fed into the load line. The shells or bomb cases feed in from one end of the load line, are inspected, gaged, cleaned, painted and pre-heated to remove the effects of cold or moisture that may have accumulated during the storage period. The painted shells are placed in trays on monorail dollies, shown in Fig. 1 and are carried by monorail to the stations where molten TNT is poured into the shell casings, as in Fig. 2. These monorails are among the finest examples of the complete conveyor system that is used inside the load lines proper.

The explosives meanwhile have come in from the opposite end of the line and have been prepared for the shells, the TNT by melting in one of the large melting units shown in Fig. 3. The molten TNT is poured from rubber buckets into the shells while they are in the trays suspended from the monorail. Certain other operations are then performed, including drilling in the hardened TNT to provide a booster cavity (as in Fig. 4), insertion of the booster, insertion of primer, etc. Then the propelling charge is weighed, poured into the cartridge case, and the shell and case are crimped together. The final assembly process is attaching and tensioning the fuse to the nose of the shell. Then the shells are packed in fiber containers and transported to the depot area in

bundles according to their size. Shells and bombs of various sizes are loaded in this plant, but these operations are typical.

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Almost glossed over in the above is the fact that materials for the final load line must be transported from storage areas located all over the 40-sq. mi. territory of the plant proper and its depots. Transportation, or more properly the inter-building material handling set-up, includes 123 mi. of rail line laid on ordnance plant property during the past year while the

On the other hand, in the depot area, individual storage buildings are linked only by 10 ft. roadways, so an automotive vehicle must provide the means of handling the materials here.

Delivery of assembled shells or bombs from the load line to the depot area can be accomplished either by road or rail, but if the latter method is used, the shells or bombs must be unloaded from railroad cars to trucks for final distribution in the depot area.

Efficiency and flexibility have been

ability of steel wheels on rails under like conditions. Actually, the rubber tired vehicles can pull more on a wet rail than steel wheels can pull on a dry rail, all other factors being equal. With flanged wheels retracted, Auto-Railers are easily driven off the rails, onto the auto road system and used with equal effectiveness.

The Auto-Railer has been assigned a number of primary uses. In addition, its flexibility leads to its use on numerous special as-



plant itself was being constructed, and another 100 mi. or more of roadways, much of which existed in this area before it became government property, but some of it new roadways laid out to link parts of the ordnance plant.

The road and rails constitute the system over which materials must be transported to the load line. The igloos, magazines and other storage buildings are all linked by rail and, from them, double tracks run into each of the three load lines. In part, primary roads also connect the storage areas with the load lines, although actual access to most of the storage buildings is by rail only. The only direct connection between load lines is by automobile roads. With this set-up, the rails provide the main connection between storage areas and the assembly areas.

FIG. 7—Materials from storage outposts all over the property can be picked up and rushed to the loading line by the Auto-Railer. Igloos like this are connected only by rail lines, but the Auto-Railer can get in to pick up l.c.l. loads at any time.

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given to the material handling system between storage areas, load lines and depot by the use of Auto-Railers of different types and sizes. The vehicles have rubber tires running on rails, with rubber-cushioned steel-flanged wheels fore and aft for guiding, as illustrated in Fig. 5. The rubber tires carry approximately 75 per cent of the load of the vehicle when it is on the rails and afford more than six times the tractive and braking

signments in the ordnance plant area and depot area.

Two of the primary uses of the Auto-Railer are in connection with moving materials from the storage areas to the load line. Auto-Railer locomotives with standard railroad couplers and express cars, (double-ended vehicles with all wheels steering) shown in Fig 6 are used for switching in just about the same fashion as diesel electric locomotives, and for hauling explosive trains.

Stake trucks and special explosive trucks, Figs. 7 and 8, are used to transport small lots of material or to rush pick-up work over the extensive area covered by the plant. Any of these vehicles will operate on road or on rail so that it is possible to take the shortest route to the objective in any case. If the railroad track is blocked by



FIG. 8—Here the rail wheels have just been withdrawn, and the Auto-Railer is about to be driven onto a road. These versatile trucks have speeded material handling to a very great extent and will likely find applications in other industries.

cars or trains, it is not necessary to wait for their removal, since the Auto-Railers, with flanged wheels retracted, can be driven off the rails, around the obstruction and then back onto the track. In switching operations, these vehicles can be driven on the highway system to an intersection near the point where their use on the rails is needed, so that it is not necessary to clear an entire stretch of track to perform operations on a

small section of it. The Auto-Railers can haul 10 empty or four loaded boxcars.

Between the storage areas and the load lines these vehicles contribute greatly to the flexibility of the material handling system. Where railroad car movements take hours to initiate and accomplish, or even over night, the Auto-Railer vehicles cut across lots, take on a load of materials or move boxcars, whichever is desired, and have the

job done before a rail movement could even be started.

If, because of production scheduling, changes in plans, unexpected shortages caused by rejections or any other reason, quantities of materials are needed quickly, the Auto-Railers are able to locate them and bring them to the load line in time to avert any stoppage of operations.

Between the load line and the depot area the Auto-Railers have been particularly useful since they eliminate cross-handling from rail to truck by carrying completed shells or bombs direct from the load line to the individual storage building in the depot area where they are to be placed.

A variety of other Auto-Railer units have been put into service in the ordnance plant, including buses, a special laundry vehicle, a cafeteria unit, an ambulance and an inspection car. Some of these were used during the entire construction period at the ordnance plant for general utility work.

In operations where the Auto-Railer is used on rails most of the time, there is an important differential which is reflected in cost per ton-mile of operations. A railroad locomotive costs at least \$15.00 an hr. to operate, while the Auto-Railer costs are figured on the basis of \$2.00 an hr.

Quick-Immersion Thermocouple Investigations

THE third report of the liquid steel temperature sub-committee of the Iron and Steel Institute (British) covers the work carried out during the past two years with the quick-immersion technique for measuring the temperature of liquid steel by means of a platinum thermocouple.

The experiments were carried out in a steel plant at Sheffield, and reported to the 1942 annual general meeting of the Institute. In the first section of the two-part report, some general comments are made on the design of the quick immersion thermocouple, on temperature distribution and control in the furnace and ladle, and on the

emissivity and optical pyrometry.

Section II, by Dr. F. H. Schofield, gives an account of recent tests made with the quick-immersion thermocouple in several steel plants at Sheffield, with suggested improvements in the thermocouple mountings in open hearth, arc, and high-frequency furnaces.

Special applications of the thermocouple are discussed, some of which are: (1) Determining the temperature distribution in arc furnaces, (2) comparison with optical pyrometers in an open hearth furnace showing that only during the boil does the optical instrument give even opproximately the steel temperature, and (3) the determina-

tion, by means of the thermocouple, of the accuracy of two types of optical pyrometers when sighted on a stream of steel. The two types of optical pyrometers checked were the disappearing filament type and the new color pyrometer, which has proved decidedly inferior. The measurements in the trough, showing the constancy of temperature in outflowing metal during the ½ hr. period required for casting from a 25 ton ladle, are also shown.

The definite routine of temperature measurement with quick-immersion thermocouples, worked out at several small steel furnaces, and the results obtained in some of the larger furnaces are also explained.

Protection For Welding Operators

DEQUATE and proper protection for welding operators is one of the greatest economies to be effected in a welding plant production schedule. In spite of the fact that a plant may purchase the highest quality of welding materials to use in the manufacture of their products, a production schedule can be maintained only as long as the welding operators themselves are kept on the job, and are protected against accidents and occupational hazards. Such protection can be assured in industry today by furnishing welding operators with the best welding aids, such as helmets, handshields, gloves, aprons, sleeves, goggles, and lenses for body protection, as well as electrode holders, ground clamps, and cable for safety and convenience in the performance of their duties.

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Naturally, one of the most important items of protection is lenses for masks and goggles. There is no question that eye protection is a most important contribution to continuous production and work quality, and effects further economies by eliminating lost time and permitting speedier operations.

Injury to the eyesight of welding operators is the result of two factors: The brilliance of the welding arc and the radiation of invisible rays that have a detrimental effect on the human eye. Radiation from intensely heated solids or vapors may be divided into three classes:

(1) Invisible infra-red rays at one end of the spectrum, (2) visible light rays in the spectrum, and, (3) invisible ultra-violet rays at the other end of the spectrum.

The radiations under these headings, although of common origin, have diverse effects on the eyes. The infra-red rays produce a sensation of heat when they fall upon unprotected skin, and are believed to be able to penetrate the eye. When sufficiently intense, the effects of these radiations are serious, much like a burn within the eye.

Ultra-violet radiations, like infra-red rays, are invisible, and are known only by their effects. These radiations begin to become dangerous to the eye at a wavelength of about 305 millimicrons, and are increasingly dangerous as the wavelength becomes shorter. It is considered by authorities, however, that the eye itself is so constituted

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that the ultra-violet radiation cannot penetrate its substance, so it is immune to these rays. However, the mucous membrane and tissues on the surface of the eye may be affected in a manner analogous to sunburn.

Visible light rays, likewise, may have a deleterious effect on the eye, much in the same manner as looking directly into the sun. Repeated exposure to such intense light may cause blindness.

In consideration of the effects of these radiations on eyesight, it is necessary and the only safe course to provide safety glass that is opaque to both ends of the spectrum, and yet transparent enough that the visible radiations will penetrate it sufficiently to see the work. Since the eye is more sensitive to the red end of the spectrum, considerable research and development by glass manufacturers has resulted in several varieties of glass that are excellent refractors of these lower frequency radiations.

Specifications as developed by the National Bureau of Standards require that the density of lenses shall be designated by shade numbers. The lenses must be uniform over their entire surface to within 10 per cent of the most dense part as measured by the transmission of incident light. Such lenses must

possess maximum transparency between 525 and 600 millimicrons, with gradually increasing absorption on either side, the dominant hue being yellowish green. The limitations on the transmission of radiant energy, infra-red, visible and ultra-violet light to which all lenses must conform are shown in the accompanying table. Popular shades are: No. 5 for gas cutting, No. 6 for gas welding and Nos. 10 and 12 for electric arc welding, these shades varying with arc intensity.

As good colored lenses are expensive and may be readily damaged by splashing metal and flying particles, goggles and masks are provided with clear cover glass shields. Frequently these cover shields are coated with a preparation to reduce the adherence of particles of hot metal.

Occasionally, a lens is needed that is adaptable to more than one type of work, such as for welding and chipping. One manufacturer makes a duplex goggle with colored and clear hardened lenses, another makes the No. 5 shade lens in a hardened glass. Another solution to this problem is the use of cellulose acetate covers.

Lenses should be carefully examined with a high intensity light for pin holes, because such defects cause the operator's eye to unintentionally stray toward them, eventually causing discomfort. Another defect in goggles is in having lenses that are not identical. A rarer defect that has been observed, especially in imported lenses, is in hav-

Transmission for Eye Protective Lenses

Chada	Permis	sible Variation, F	Total Infra-Red,	Total Ultra-Violet.			
No.	Maximum	Standard	Minimum	Per Cent	Per Cent		
3	22.9	13.9	8.6	9.0	0.1		
4	8.5	5.18	3.3	5.0	0.0		
5	3.2	1.93	1.2	2.5	0.0		
5 6	1.18	0.72	0.45	1.5	0.0		
7	0.44	0.27	0.166	1.3	0.0		
8	0.162	0.10	0.062	1.0	0.0		
8	0.060	0.037	0.0230	0.8	0.0		
10	0.0229	0.0139	0.0087	0.6	0.0		
11	0.0085	0.0052	0.0033	0.5	0.0		
12	0.0032	0.0019	0.0012	0.5	0.0		
13	0.00118	0.00072	0.00045	0.4	0.0		
14	0.00044	0.00027	0.00017	0.3	0.0		
15	0.00016	0.00010	0.00006	0.3	0.0		
Clear Lens		92.0	89.0				
Cover Glass		92.0	89.0				

NOTE: Visible transmission is based on the percentage of the visible radiations of a gas-filled tungsten filament lamp operated at 2950 K determined photometrically.





GLOVES like these give best results in comfort and safety.

ABOVE LEFT

THE well-dressed welding operator should be dressed like this. The helmet has a skull guard, built-in ventilators, reinforced lens holder, and adjustable head band, while the apron, sleevelet, and gloves are like those described in the text.

ing absorption bands of different widths in the orange-yellow portion of the spectrum within a single lens. Transmission of ultra-violet or infra-red rays is another common defect in the less expensive lens. These lens defects cause either eye strain to the operator or do not afford adequate protection, and must be avoided for best operating conditions and physical health of the operator.

When a satisfactory type of lens has been found, it remains up to the operator himself to select the shade or density of color that is best suited to his particular sight and work. Acuity of vision varies considerably in individuals, so that a man with very good eyesight may get a clear definition of his work with a lens that would be too dark for another man whose sight is not so keen. The optimum lens is one of the darkest shade that shows a clear definition of the work without any eye strain.

For greatest protection to the welder's eyes, lenses should be procured that are in accord with and meet the specifications as outlined in the Federal Specification, Sec-

tion GGH-211, Section IV, as such lenses are now manufactured and carried as regular stock by a number of reliable companies that specialize wholly in this class of merchandise.

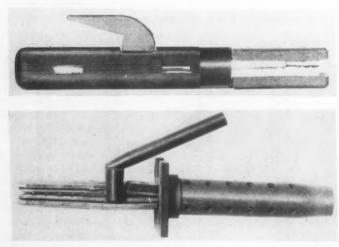
Helmets and Handshields

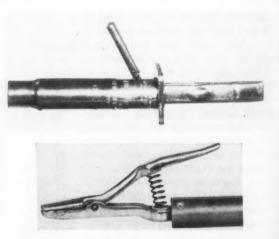
Welding helmets and handshields should likewise be selected on their merits rather than cost, and the design and materials of these items should be such that they afford the welding operator the utmost in comfort, safety and usability. The material used in forming and assembling these devices should be a high grade, black fiber, sufficiently thick so as to prevent warping and resist flying parts, molten metal, and of such materials that they can be sterilized without deterioration. An important feature of the helmet is the headband, which should be so constructed as to render comfort and easy adjustability to several positions.

The lens holder itself should be so designed as to prevent light leakage, and so arranged that with a minimum of effort the glass and lens can be easily replaced. The body of the helmet or handshield should be so formed that it affords protection to the neck and chest, yet close-fitting well in back of the ears, and affording adequate ventilation.

Gloves, Sleevelets, and Aprons

Welders' gloves, for best results, should be of genuine chrome leather, unlined, and of the gauntlet type. They should have a double thickness of leather on the inside of the thumb, and have an additional patch of leather over the back of the left hand. All inside





THESE holders are: top left, the Jackson; bottom left, the Duro; top right, the Eureka, and bottom right, the clamp type arc-welding electrode holders.

sewing, covering the knuckles and stitching on the back of the wrist, should be such that sparks will not ignite the stitches, and experience has indicated that the glove should be reinforced with a strip of leather around the crotch of the thumb with no seams between the index finger and the thumb. Experimentation with a group of production welders warrants a gauntlet 6 in. long with a $5\frac{1}{2}$ in. width at the wrist, to enable the worker to shake off the glove quickly in the event of burns. Any gauntlet that is greater than $6\frac{1}{2}$ in. wide at the end has a tendency to catch and hold sparks and spatter.

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Sleevelets should be full arm length, have shoulder straps, and be of a good pliable material. If not made of leather, the material should be flame-proofed to avoid supporting combustion. Aprons other than leather are usually made of 12 oz. duck, flame-proofed and reinforced in the front with a patch of asbestos material 24 x 36 in. This gives the apron longer life against spatter accumulation and affords the operator better protection when his welding is carried on in a sitting position.

There is reason to be confused in electrode holder selection because of the wide variety of these units being offered today. However, a close examination of these items will narrow the field to about five designs, any of which can meet industry's requirements today. Electrode holders should be so designed that they are light, well balanced, and have a strong gripping element for the electrode to prevent undue heating from poor electrical contact. Furthermore, renewal and replacement parts should be such that they are easily applied and consistent with the first quality of the holder.

The foregoing are some of the fundamental essentials necessary in the selection of protective and serviceable articles for the welding operator. Many other welding items, likewise, should be selected with the same care to insure safety, comfort, and efficiency to the operator.

New Tinning Oils Investigated

N tin plate manufacture and in tinning mild steel hollow-ware it is customary to have a layer of oil floating on the molten tin bath. The traditional oil used for tin plate is palm oil, and tallow for hot tinning. These oils give good service to industry, but if they should become scarce their cost might become excessive. Further, they are not without their limitations, consisting as they do essentially of a mixture of glycerides of a number of saturated and unsaturated fatty acids of varying values in the tinning process. After some time, at the relatively high working temperatures, they deteriorate due to polymerization, oxidation, and the evaporation of certain constituents; and as their viscosity increases they adhere excessively to the emerging tinned steel. For some purposes their working temperature is too restricted; and the fire hazard is considerable.

An ideal tinning oil, according to W. E. Hoare, in an article entitled,

"New Tinning Oils," published by the Tin Research Institute, might be considered as consisting of a relatively small proportion of some active constituent carried in a nonactive and stable base. Mineral oils provide a wide range of choice, and oils can be selected suitable for use throughout a relatively wide range of temperatures with excellent stability and considerable freedom from fuming and fire hazard. Each carrier may be combined with a choice of active agent, and a large number of tinning oils were made up and tested comprehensively in the Institute's hot tinning laboratory.

The tests included a simulation of hot tinning practice, where the layer of oil is relatively thin, and in tin plate practice where a relatively thick layer of oil is used. Some interesting tinning oils were found, and one oil in particular had outstanding merits. Not only were its tinning qualities superior in most respects to either palm oil or tallow,

but in a comparison carried out at a high temperature, after $8\frac{1}{2}$ hr., its qualities were as good as palm oil after 4 hr., and, although darker in color and viscous, it was still fluid. Palm oil after $8\frac{1}{2}$ hr. under the same conditions had degenerated to a hard semi-solid mass.

Certain mineral oil bases can be worked at very high temperatures compared with palm oil or tallow; for instance, one oil proved to have a useful length of life even at 599 deg. F. This would be particularly valuable in hot tinning certain articles where size and weight make manipulation after tinning difficult if the finishing pot is at the usual temperature of 464 to 482 deg. F. Other oils are suitable for covers for lead-tin baths. In addition to the tests carried out at the Institute on an approximately commercial scale, trials extending over some days have been made in several representative industrial plants with gratifying success.

Low Tin Alloy for Collapsible Tubes

PATENT applications have been made for the use of a new low tin alloy to be used by Bristol-Myers Co., in the manufacture of extruded container and collapsible tubes, and the product is now in successful production. The new type tube, developed by Messrs. G. Derge, F. N. Rhines, and A. H.

Grobe, of the Metals Research Laboratory of Carnegie Institute of Technology, Pittsburgh, offers real relief in the present and threatened difficulty with respect to the availability of tin.

The alloy contains approximately 84 per cent lead, 12 per cent tin, 3

per cent antimony, and 1 per cent copper, and has a bright appearance similar to that of tin. Its excellent corrosion resistance toward a great many materials commonly packaged in collapsible tubes makes it an ideal substitute for the tubes heretofore used.

Deep Girders Welded by Automatic Arc

A NEW development in the field of steel fabrication which opens entirely new vistas in design of many structures, including buildings, bridges, large machines and many types of heavy mechanical equipment, is the use of automatic arc welding in fabricating special shapes which are not available from mills as standard rolled members. No longer need the designer be restricted by lack of desirable structural elements to



FIG. 1—Deep girder made from split 1-beam or H-beam and steel insert automatically welded.

carry out his ideas of most advanced design.

This new development is utilized in fabrication of deep girders for use in manufacturing equipment for the U. S. Navy by the Dravo Corp., Pittsburgh. The concern, finding it impossible to obtain deep girders of the proper dimension for the work, decided to insert web plate between the portions of a split I-beam, as shown in the sketch. In one instance, a 14-in. I-beam with a 12-in. flange was split and a 3/8 by 28-in. plate inserted into the web to increase its depth. The joints are welded from both sides.

For another job, an H-beam $12\frac{1}{2}$ in. deep with $15\frac{1}{2}$ -in. flanges and web $\frac{7}{8}$ in. in thickness was split and a 7/16 by 54-in. plate inserted to make an extremely deep and heavy girder. The completed girder was 35 ft. long and 67 in. deep.

To do work such as this quickly and well, the company used an Electronic Tornado automatic welding head supplied by the Lincoln Electric Co., Cleveland, mounted on a rack post arrangement as shown in Figs. 2 and 3. In Fig. 2, a filler wire may be seen feeding over the top of the head from a reel and into the arc. Since the arc is between the carbon electrode and the work, the oxygen and nitrogen in the atmosphere have less opportunity to combine with the weld metal, which is fed into the arc in the form of bare wire. Therefore the only protection needed is in the form of an autogenizing element introduced into the arc flame at the point of

On this particular installation, on plates up to ½ in., a paste is painted on the plate and a so-called fibrous autogenizer is fed into the

arc alongside of the carbon in the form of a chemically impregnated paper fiber. The heat of the arc consumes the fiber and releases protective gases similar to those formed by the heavily coated electrode type. On plates heavier than $\frac{1}{4}$ in., a powdered flux is used which

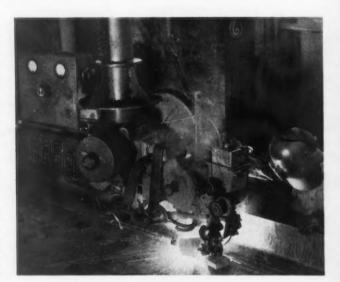
RIGHT

FIG. 2—Close-up view of the Electronic Tornado carbon arc automatic welding head installed by the Dravo Corp. for fabricating deep girders from plates and split H-beams. Control panel is at left.

0 0 0

BELOW

FIG. 3—Unusual type of two-deck cantilever crane for carrying the welding head on a post and carrying all the auxiliary electrical apparatus along with the crane, which runs the entire length of the shop.





is ordinarily deposited on the seam just ahead of the arc. Both these autogenizers leave a protective layer of slag over the molten weld metal so as to protect it from the atmosphere until it is thoroughly cool.

Since the filler metal does not carry current, there is no need to provide a method for contacting the bare rod. For the same reason, spatter is almost entirely eliminated

c s e

The Electronic Tornado head it-

self is supported on a double deck cantilever crane of unusual construction, Fig. 3. On the lower tier, there is a small generator for providing direct current for the control system; also a cooling reservoir, radiator and fan, as well as the motor for elevating the welding head post by pinion and rack and another motor for propelling the crane along the wall tracks. The crane is arranged to run the full length of the shop, and the speed of

longitudinal travel is governed by a rheostat mounted near the welding head as can be seen in Fig. 2.

The post upon which the head is mounted permits it to be moved up and down manually for fine adjustment or by power.

On the upper platform of the cantilever crane is mounted an 800-amp. Lincoln SAE welder and an automatic contactor panel for controlling the head.

Deformation at High Temperatures

A STUDY was made for the Iron and Steel Institute (British) on the behavior of carbon steels under tensile and long-time creep tests at temperatures from 59 to 1750 deg. F. The steels examined had carbon ranges up to 1.14 per cent

The effect of carbon content was most noticeable in short-time tensile tests, but as the temperature was increased the effect was reduced. In creep tests at a temperature of 842 deg. F., there was a marked difference in the life of specimens of certain steels, those of high carbon content showing the greatest strength. At 1022 deg. F. and over, carbon had little effect in creep tests. The alpha to gamma structural change in iron and low carbon steels between 1292 and 1652 deg. F. caused a marked increase in the strength as measured by the tensile tests, but in high carbon steels there was little alteration in properties resulting from this change.

The experiments show a general weakening of the steel with increased temperatures, the deformed material showing evidence of slip and dislocation as well as recrystallization, spheroidization, graphitization, and cracking. The various materials examined showed these effects to varying degrees, depending upon the chemical composition.

The deformation of ferrite occurred by slip action, but a new mode of deformation referred to as dislocation occurred in the pearlite deformation. It appears that the pearlite can be deformed by a shearing action on a plane inclined to the ferrite and carbide lamellae of this constituent.

Spheroidization was an important feature of these steels be-

cause of the greater prominence of pearlite in the high carbon samples Recrystallization of the ferrite was not so prominent a factor as in the low carbon steels, previously described. Graphitization was also common in high carbon materials, particularly below the critical range. Graphite formation was found in the highly deformed steels near the fracture in creep tests at a temperature as low as 842 deg. F. The graphitic areas acted as centers of weakness at which cracks developed in stressed specimens.

It appeared that graphitization assisted the development of intercrystalline cracking which was observed above the critical range. The investigations show that steels referred to as "rapidly graphitizing" offer, in general, a poor resistance to creep and they spheroidize rapidly.

Vanadium in Cast Iron

COMPREHENSIVE survey of the literature and several conclusions drawn from examinations of the effect of vanadium additions to cast iron were presented by E. Piwowarsky in a recent issue of Die Giesserei. Cast irons containing 0.08 to 0.35 per cent vanadium will easily oxidize and additions must be carefully made. Furthermore, as the silicon and carbon contents of the iron are reduced, as the casting thickness is reduced, and as the furnace is driven harder, vanadium stimulates carbide formation. The iron

structure is only slightly changed by additions of up to 0.3 per cent vanadium, but, with greater additions, free carbides of globular shape separate out and there is a tendency to segregate, affecting the castability.

Each 0.1 per cent vanadium added increases by 86 to 104 deg. F. the temperature at which the formation of temper carbon begins. Tensile strength of ordinary cast irons is increased 2844 to 4266 lb. per sq. in. for each 0.1 per cent of vanadium added, while such properties of high duty cast irons are

only slightly affected, it was stated.

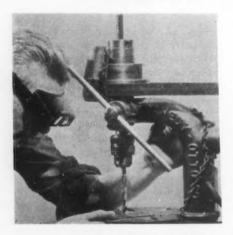
Vanadium decreases the amount of gas in iron and increases its density. The strength of cast iron at temperatures between 750 and 925 deg. F. appears improved by the presence of vanadium. A study of freezing points and structures of irons containing different quantities of vanadium showed that the general effect of the element was to shift the iron-carbon diagram to the right. In general, vanadium is considered a better substitute for chromium than for molybdenum in cast irons.

New Equipment

Small Tools and Gages

Many new small tools, gages, tool accessories, and other useful items around a shop or plant are described in this week's section on new equipment.

HE new Magni-Focuser eye The new magnitude to a variety of shade, adaptable to a variety of uses, is equipped with a pair of



stereoscopic five power magnifying lenses, which, by a slight tilt of the head, brings the subject into magnified focus. When not using the lenses the operator can look below the shade with normal vision. The eye shade permits the wearer to have both hands free, and is made by Edroy Products, 480 Lexington Ave., New York.

Bin Racks

A LINE of bin racks, hopper bins, and other equipment for storing small parts and material has been developed by Gordon L. Hall Co., Old Lyme, Conn. The bins are arranged so that parts are vis-



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ible to the last one and are always accessible because of the forward slope of the bin. Bin racks of various sizes are built, and more than one size bin unit can be built into a rack.

Illuminated Magnifier

AGNI-RAY is a new illuminated magnifier that plugs into standard 110 volt circuits. It was developed for quick, but accurate, inspection of castings, tools, dies, and for setting tools on precision lathes, thread grinders, and for jewelers. The glass, magnifying three power plus, can be removed from its stand and attached to a tool so that work can be watched



during operations. Made by George Scherr Co., New York, the Magni-Ray is available in two types, one with a 3-in. lens and the other with a specially designed 2-in. wide achromatic lens.

Caliper Rules

HANDY, pocket size, caliper A rule for inside and outside measurements has been announced by Stanley Tools, New Britain, Conn. This No. 1361/2 rule permits measuring hole diameters from 7/32 to 5 in., and widths or lengths up to 5 in. Diameters of rounds up

to 3 in. can also be measured. The rule is made of boxwood with a brass caliper slide graduated in 1/32 in. over its full length.

Rivet Hole Brush

NEW end-brush that is used in an ordinary hand-electric drill for cleaning off a small area around rivet or bolt holes assures good metal to metal bond in joining oper-



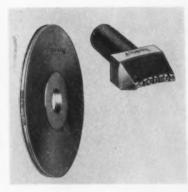
ations. The brush, designed by Osborn Mfg. Co., Cleveland, is made of wire and has a pilot rod to fit into the bolt hole. It is claimed that the brush does not clog and that it works better and faster than other methods of cleaning.

Toggle Clamp

M ODEL 830 midget toggle clamp was recently announced by Knu-Vise, Inc., Detroit. The unit is furnished complete with spindle and rubber cap, measures $4 \times 1\frac{1}{2}$ in., and exerts a pressure in excess of 500 lb. Because of its small size and great holding strength, the clamp is ideally adapted to aircraft work.

Marking Roll

MARKING roll for marking A wire, rod, strip, or tube that is rolled or extruded, and a press stamping die for use in a punch press have been designed by Acromark Corp. The diameter of the roll determines the spacing of the marking, and can be had in various sizes. The roll is held in a fixture



that permits adjustment to constant pressure sufficient for marking and for rotating the roll die by friction. The press stamping die is curved for marking all parts that fall within the range of its curvature.

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Inspectors' Stamps

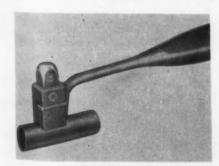
I NSPECTORS symbol stamps have been designed by Acromark Corp. in 100 new figures. The symbols are sharp and distinct so



that similarity of mark will not cause error. Each stamp can be used for an individual inspector, who is known by his recorded mark.

Stamp Hammer

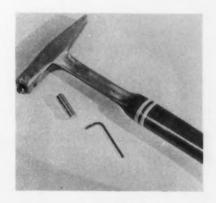
THIS steel stamp hammer was developed for safety in striking impressions on steel products for identification, inspection, or other



vital data. The stamp is held in place by a "shepherd hook" holding device and the stamp floats up and down in order to find its own location on varying diameters of round or oval shapes. The hammer cannot be used upside down, an important feature in registering heat numbers when an upside down 9 or 6 can cause serious consequences. The holder is made to hold any size steel stamp, and the stamp cannot bounce out because of forceful hammer blows. Jas. H. Matthews & Co., Pittsburgh, makes these hammers.

Inspection Hammer

DESIGNED for ruggedness and durability in continuous service, a new inspector's hammer in which steel stamps can easily be



interchanged is offered by New Method Steel Stamps, Inc., Detroit. The hammer weighs 1 lb., is of allsteel design with a compressed rawhide handle, and head and shank are finished on all surfaces. The hammer head is accurately drilled for round stamps ranging from ½ to ¾ in. in diameter, and the stamp is held in place by a set screw.

Steel Markers

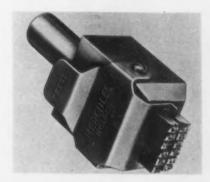
NEW METHOD STEEL STAMPS, INC., Detroit, is offering an expanded line of markers of various types for cutting slots, notches, knurls, serrations, graduation and calibration lines on machinery, ordnance, dials, indexing or calibrating rings, and beveled disks. These markers are made



in cylindrical type roll form with calibrations around periphery, in stamp form for use in presses, and in bevel type roll form with indexing on arc of circumference.

Two Line Stamp Holder

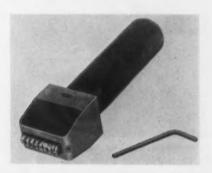
THE new Hercules holder for steel stamps will hold numbers, letters, or symbols on two lines of



type, and both lines are quickly interchangeable by thumb pressure on the holding clip. Made by *Acromark Corp.*, Elizabeth, N. J., the holder was designed to take the place of individual steel stamps and is furnished in curved line styles for stamping cylindrical or oval pieces.

Wedge Lock Holder

I NCORPORATING a new shockproof feature, a newly designed interchangeable hand stamp holder



is offered by New Method Steel Stamps, Inc., Detroit. The new holder has a wedge lock that prevents the individual stamps from loosening after continued use. The wedge lock holds the stamps both sidewise and endwise, and a single set screw retains all stamps in position. The holders are made to accommodate any number of characters and all sizes of stamps. They are also available with shanks to fit presses.

Socket and Tool Sets

BONNEY FORGE & TOOL WORKS, Allentown, Pa., recently introduced two new tool and socket sets, one a 74-piece set known as the BB1 set, and the other a 20-piece set known as the TD12 set. The sets include a full range of sockets from 5/16 to 3/4 in. and from 13/16 to 1 in. with double hexagon openings. Other tools included in the sets are tappets, box wrenches, chisels, punches, pry bars, screw drivers, drag link sockets, etc. They are packed in light, strong boxes, and are easily carried.

Cable Splicer

THE new Universal cable splicer, manufactured by Mechanics Engineering Co., Jackson, Mich., was designed especially for aircraft work, and is simple, compact, and ruggedly constructed. The splicer



with interchangeable adapters, will take care of a wide range of thimbles, bushings, and cable sizes, and handles cables used in light sling and hoist work.

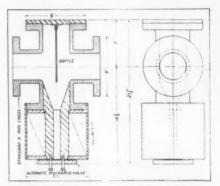
Box Pattern Wrench

J. H. WILLIAMS & CO., 225 Lafayette St., New York, recently added a structural box pattern wrench to its line of chromium-molybdenum Superrenches. The new wrench is designed for structural work, has a 12-point box head and an offset handle. The long tapered handle is sufficiently strong for lining up bolt holes. The wrenches are available in six sizes, with openings from 17/16 to 23% in.

Magnetic Separator

A MAGNETIC separator installed in a pipe cross for removing iron particles from liquids has been developed by Dings Magnetic Separator Co., Milwaukee. The separator consists of a baffle installed in a pipe cross, which de-

flects the flow of liquid to the poles of a high intensity electro-magnet. A considerable amount of iron can be allowed to accumulate at the poles before cleaning is necessary, and cleaning is easily accomplished by interrupting the current to the magnet. This causes the magnet to



become de-energized and releases the iron through an automatic discharge valve, causing the iron particles to be flushed out. The magnet is supplied with a rectifier for supplying d.c.

Die Cradle

THE Acro die cradle, made by Acro Tool & Die Works, Chicago, is a universal parallel unit, adjustable in length to accommodate varying sizes of dies, jigs, and metal parts, with parallel vertical supports and top cross-pieces holding the work in a perfectly level position. The new unit eliminates makeshift work supports, assures correct alinement for machining operations, and helps speed production and promote safety. Parallels are 7 in. high, with length adjustments up to 20 in. It is made of high grade steel, hardened and ground, and is light in weight.

Tool Stand

THE new tool stand manufactured by Penn Metal Corp. of Pa., 36 Oregon Ave., Philadelphia, will keep tools right on the job, saving time and labor required in maintaining a central tool crib. The stand can be used for 3-shift operation, a drawer for each shift. Drawers are 18 in. wide, 16 in. deep, and 5 in. high, and overall size of the unit is 30 x 18 x 32 in.

Surface Plate

A^N improved design of surface plates made by *Machine Products Corp.*, Detroit, has met with favorable acceptance in plants

where plates are in use. These plates resist deflection under load and retain the accuracy because of the special ribbing form that supports them. Sizes range from 10 x 15 to 48 x 96 in., and ample clamp-



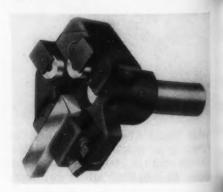
ing space is provided all around the edges. The top is given a special heat treatment in manufacturing to relieve casting and machine strains, thus preventing distortion after the surface has been scraped.

Cutting Oil

DISTINGUISHED by a heavy sulphurized content for maximum cooling efficiency and extraordinary penetrative and coating properties, Pawco Kleerkut cutting oil, recently introduced by Pawling Refining Corp., Port Chester, N. Y., is claimed to increase cutting tool life. Cleaner cuts and freedom from crimping are other features claimed for the product. Pawco cutting oil is processed from castor oil, completely degummed.

Box Tool

A NEW model "A" box tool of improved design, built for use on hand or automatic screw machines, is said to save set-up and regrinding time, reduce rejections, and lower tooling costs. The tools are made for left or right hand operation in three size ranges: 3/32 to 3/8 in., 3/16 to 5/8 in., and 1/4 to 7/8 in. diameters. A tool bit can be removed from the holder, ground, returned and set in the correct position in a minimum of time. The tool is made by Boyar-Schultz Corp., Chicago.



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Meel makes history... Day and night, Steel is pouring from our ladles, rolling from our mills to be transformed into guns and hells, tanks and trucks, tools and machinery. In every emergency since 1826 we have answered the call to arms. Once again we are working to the limit of our capacity in time of war so that we can serve you better in a free America after the Victory is won.

ALAN WOOD STEEL COMPANY

All OFFICE AND MILLS: CONSHOHOCKEN, PA. District Offices and Representatives: Philadelphia, by York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, Cheans, Pittsburgh, Roanoke, Sanford, N. C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

Assembly Line . .

• Summary of week's events in negotiations between GM and union shows tremendous differences of opinion which exist . . Public opinion may prove helpful in achieving settlement.



ETROIT—Wartime labor relationships in the United States appear to be heading rapidly toward the point where specific policies and stability, both much needed, will come into existence.

Events important both to labor and to industry occurred in Detroit last week. Much that happened is off-the-record, needs to be brought to light (and will be) but, first of all, it is important that many of the on-the-record happenings be put down in an organized form to serve as a reference.

Highlight of the week occurred when C. E. Wilson, president of General Motor Corp., threw a couple of bombshells in the direction of the UAW-CIO at the start of collective bargaining negotiations between the union and GM for revision of their contract.

Wilson, who has assumed an important position of leadership in industry councils and is looked to increasingly as one of the chief spokesmen of the industry, tried to initiate a new policy in labor negotiations, proposing that the press be invited to attend the GM-UAW contract parleys. He telegraphed Walter Reuther, head of the GM department of the UAW, that "in view of the fact that the corporation is no longer producing automobiles but is now engaged almost entirely in the production of airplanes, tanks, guns and ammunition required to win the war" he wanted to admit the accredited representatives of the public press. Asserting that one of the objectives of GM is to insure fairness "to the public and to the country who must pay through taxes for the war material being manufactured," he asked that the union accept this proposal.

Must Double Time Be Paid for Sunday Work?

• • • By declaring that "continuous work" on war orders is necessary, the War Production Board apparently can set aside double pay for Sundays or holidays. The exact language on exceptions to double time payment in the General Motors Corp.-United Automobile Workers agreement follows:

ers agreement follows.

"Double Time—For the regular working hours of any shifts that start on Sundays, and the following legal holidays: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving and Christmas and any time worked in excess of 8 hr. on a shift which starts the previous day and runs over into such Sunday or holiday.

"Exceptions to above overtime payment — Employees working in necessary continuous seven-day operations whose occupations involve work on Saturdays, Sundays and holidays shall be paid overtime for work on these days only for time worked in excess of eight hours per day or in excess of 40 hr. in the employee's working week, for which overtime has not already been earned."

Nelson Opposed to Sunday Double Time

• • • Donald M. Nelson, WPB chairman, declared this week at Washington that the privilege of double pay for Sunday and holiday work in war plants must be suspended for the duration of the war. He said:

"We are moving as fast as we can toward seven-day, three-shift operation of our basic war industries. The principle that a man should regularly have the seventh day off and should receive overtime pay if an emergency forces him to work on that seventh day, is perfectly sound; but where that seventh day does not fall on a Sunday or holiday, I do not think that work on Sundays and holidays, in wartime, deserves extra pay."

REUTHER certainly must have been in an uncomfortable position when that proposition was placed before him. The press, the public (and others in industry who have engaged in such negotiations) know that there is a lot occurring in such negotiating sessions that could not stand the white light of publicity. At the same time, Reuther claims to represent a very democratic labor organization that asserted in the past that sessions between industry and labor should be open for all to see. (This claim was made in connection with the Jan. 5 meeting of historic importance in Washington.)

But there are strange things done today without a blush, and Reuther's answer was simply a "suggestion" that the present negotiations be held "in the usual manner" and that issues which cannot be settled in direct bargaining be submitted to the War Labor Board where final determination would be subject to public scrutiny.

Over the weekend this union position was subjected to a terrific barrage of criticism and when sessions resumed early in the week it appeared likely that further developments in this channel would be recorded.

Meanwhile, on Friday, when the negotiating sessions were getting underway in one wing af the General Motors Building in Detroit, Mr. Wilson called press conference in another wing of the building and proceeded to air the proposals and counter-proposals which were then undergoing secret negotiations in this star chamber "democratic" process that has become traditional in labor relationship. (Industry cannot forget, however, that it was at least partly its fault that labor negotiations became secret sessions. There have been exceptions, one when a farm equipment company in the midwest invited its employees to attend negotiations in a huge auditorium.)

To lay the groundwork for understanding of the issues, the company distributed the list of major union demands as follows:

1. Contract to cover "all employees, except those with authority to hire and fire" and those covered by other unions certified by NLRB.

2. Conditions of employment to



Just as in any other cutting operation, the right tool for the job to be done will guarantee best results. Here are a few hints that may help you in determining what type of tap best fits your needs:

1. Cost of Tap vs. Cost per Tapped Hole

Carbon Steel Taps cost less than High Speed Taps. If you can get equal results as to quality of thread from either type, then by all means use Carbon Taps.

Even though the quality of threads produced is equal, however, you may find that High Speed Taps will tap more holes at less cost per hole.

2. Operating Conditions

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Ordinarily, High Speed Steel Taps must be run at higher speeds than Carbon Steel Taps, usually 2 to 21/2 times as fast. If your tapping machines or screw machines haven't the speed necessary for efficient operation of High Speed Taps, the use of carbon taps may be ad-

Consult a cutting speed table covering suggested speeds for various tap sizes and materials.

3. Material Being Tapped

The physical properties of the material being tapped will, many times, leave you no choice as to type of tap to use; some materials require the use of High Speed Taps while others may be tapped equally well or even better with Carbon Taps. For example, Carbon Steel Taps are efficient in brass and ferrous metals while most non-ferrous metals and abrasive materials, such as bakelite, fiber, hard rubber, etc., quickly turn cutting edges and indicate the use of High Speed Taps.

4. Results Required

Precision Threading, requiring the close tolerances obtainable only with Ground Thread Taps, will ordinarily dictate the use of High Speed Taps, since only High Speed Taps are regularly furnished with Ground Threads.

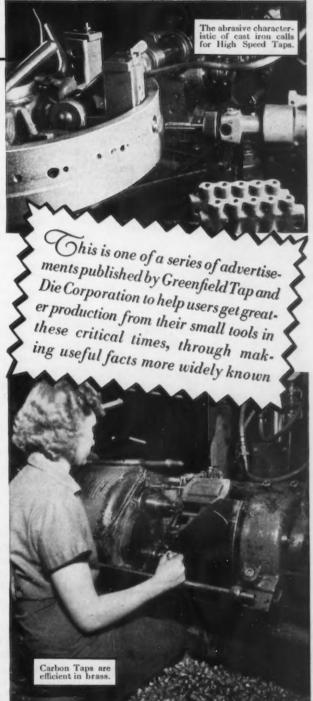
There is a tendency today to use High Speed Steel Cut Thread Taps when Carbon Steel Taps would serve the purpose just as well. Check your tapping jobs to be sure that you are using the correct type of tap for each.

Similarly, don't specify GROUND THREAD Taps if CUT THREAD Taps will do.

GREENFIELD TAP AND DIE CORPORATION GREENFIELD • MASSACHUSETTS

DETROIT PLANT: 2102 West Fort St. WAREHOUSES in New York, Chicago and Los Angeles In Canada:

GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONTARIO





TAPS . DIES . GAGES . TWIST DRILLS . REAMERS . SCREW PLATES . PIPE TOOLS

- be: (a.) New employees must become members within 30 days; (b.) Present employees must become members within 30 days; (c.) All employees to remain in good standing with local.
- 3. Shop steward for every 25 employees; chief steward for every 150.
- 4. Seniority broken only by quit or discharge.
 - 5. Five hours call-in-pay.
- 6. Time and one-half for Saturday.
- 7. Armistice Day added to list of double time holidays.
- 8. Ten per cent night shift premium when more than half the hours worked fall between 3:30 p.m. and midnight. Fifteen per cent night shift premium for hours between midnight and 8:00 a.m.
- 9. Thirty-minute paid lunch period.
- 10. One dollar per day flat increase.
- 11. Increase in wages every 90 days based on cost of living index.
- 12. One hundred dollars maturity value defense bond in lieu of vacation.
- 13. Supervision shall not be allowed to work on any hourly rated jobs.
- 14. Fifteen days, paid sick allowance time.
- 15. Sixty days, pay for employees entering military service.

These demands represent the inclusion of all employees, even unorganized office workers, the granting of the union shop, an increase in the number of stewards, a guarantee of seniority to any employee who now takes a defense job with another firm for the duration, an increase in wage premiums for callin, Saturdays, Armistice Day and nights; pay for lunch periods, and jumps in daily rates which add up to about 34 cents an hour, or between 25 and 30 per cent over present rates.

WILSON lead off the session by briefly outlining the corporation's proposals, which he said are designed to increase war production in the following ways:

- 1. By improving morale.
- 2. By more clearly defining certain working plans and methods of pay.
 - 3. By restoring incentives in the

plants to properly compensate individual workmen who are willing and able to increase their output.

4. By revising the practical handling of relations between the management and the union in the plants so that there will be more work and less talk.

He then revealed the specific General Motors counter-demands on the union as follows:

- 1. Discontinue in official union papers, handbills and other literature, attacks and accusations of "speed up" on management's efforts to increase production of war materials. Discontinue attacks on management in such media which undermine the morale of employees, thus retarding war production.
- 2. For the duration of the war, eliminate any requirement for the payment of double time under any circumstances.
- 3. The union shall recognize the right of the management to establish any system of shifts which the management decides nesessary to speed up war production. Such shifts are necessary to reconcile the 40-hour week with continuous operation of machinery.
- 4. The union and its members will withdraw their opposition and lend their support to individual piece work or other incentive method of pay when it has been determined by the management that the introduction of such incentive method of pay will step up the production of war materials. Any such change in the wage payment plans will be negotiated with the shop committee.
- 5. Provide for differentials in wage rates in certain job classifications in production so that individual employees who produce more and better work may be rewarded by being paid the maximum rate.
- 6. Promotions or transfers to higher paid jobs shall be made on the basis of merit, ability and performance of the employee. Such promotions are proper rewards for employees who show exceptional ability and put forth extra effort.
- 7. Reduce by 50 per cent the number of committeemen in the plants who have been selected by the union for handling complaints. This will save valuable time of the committeemen and supervisors and still permit the prompt handling of all legitimate complaints.
 - 8. Change the provision of the

agreement which allows investigation of the same complaint by a number of different committeemen, thus avoiding duplication of effort and loss of time. This provision has been abused and has resulted in much waste of management's and committeemen's time.

9. Eliminate provision requiring the unnecessary employment of committeemen when only a few men are working or the employment of such committeemen when it deprives the regular and more efficient operator of the work.

WILSON summarized these two sets of opposing demands in the declaration that the UAW demands simply represent "business-as-usual for the union and its members, while the corporation's demands recognize that we are in a war and it is no longer business as usual for anybody."

In the above, the first of the GM demands is based on numerous statements in the union's shop papers which appear to be almost traitorous to the nation in their assertions that production will not be speeded up if the union and its stewards can avoid it.

The second, third, fourth, fifth and sixth demands are concerned with hours and wages for labor and obviously -- would throw the union's present concepts out the window. It is significant that the demands by GM in regard to wage payment systems jibed almost to the letter with the stand reported to have been taken just a day earlier (last Thursday) by Donald M. Nelson, chairman of the War Production Board, who advocated a system of wage payments under which the most competent workers turning out the greatest war production would get the highest pay.

The seventh, eighth and ninth demands by GM all relate to the problem of getting the shop stewards out of the spots in which they now handicap production. Wilson put it this way: "If they just get out of the way with their propaganda, we'll get out the work."

Obviously, there are tremendous differences of opinion and the job of reconciling them, or ousting the union's and placing GM's in the contract, is a tremendous task but it might be helped a lot by the wave of public opinion indicated by Nelson's statement and the recent temper exhibited by Congress.



To aid users of Nickel alloys, thirty service centers are maintained in industrial areas. From these strategically located key points, our field representatives are on call to advise American industry about the selection, fabrication and uses of ferrous and non-ferrous materials. Assistance is also given on problems arising

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Through the years, research, field studies and user experience have all contributed to a fund of practical, time-proved information. Many of these data have been compiled in convenient printed form, useful both to experienced men handling new materials or performing unfamiliar operations... and to the many new employees.

Now...when minutes and materials are so vital...make full use of this metal-working experience. Send for a check list of helpful printed pieces on the selection, treatment, fabrication and use of Nickel alloys, or send your specific questions to:

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET, N. Y.

Washington . . .

 New "End Use Code" of WPB is a revolutionary step toward showing whether priority system is distributing goods and materials in sufficient quantity to war producers.



ASHINGTON—"Get Your Hunting Licenses Here.— Donald M. Nelson, Chief Game Warden."

No such legend is inscribed above the entrances of that massive block of white limestone and marble which houses WPB in Washington. But, what the WPB chairman and his associates are mainly engaged in is the issuance of hunting licenses, though they are better known as preference ratings or priority numbers.

The truth is, WPB does not have any record of the materials it has asigned preference ratings to, from the standpoint of whether business men have been able to get the materials needed by the use of those ratings. Inded, it does not know the quantities of materials, either raw or finished, needed for the war effort because there are no records to show the indirect use of these materials, and because the pattern of demands is ever expanding, intensifying the strain on the "arsenal of Democracy." It follows, that material limitation and production banning orders are predicated on guess work, at best.

WPB is puzzled as to why manufacturers who have been assigned high priority ratings have piled up large inventories of steel and other materials. On the other hand, complaint is made that ratings which should assure supplies often fail to do so. WPB is insisting on priority compliance,

and yet this compliance is the thing which has resulted in the excessive inventories. WPB cannot really allocate because it does not have physical possession or ownership of materials, except those which the various RFC corporations have bought. WPB does not know the answers. On the basis of the information it has at hand, it cannot know them. Without the answers, war production and civilian supply are in a bad situation. Without the answers, the civilian economy may become so dislocated that the successful erection of post-war reconstruction plans may be in the realm of dreams. Despite objections to the fundamentals of economics, the simple lesson of supply and demand suddenly becomes important, and difficult to learn.

HOWEVER, WPB is trying. It is putting into operation a scheme this week called the End Use Code, the object of which is to determine supply and demand for every material going into every article of manufacture. Then WPB will be able to determine as a matter of policy where materials ought to go. Eventually, preference ratings may come to mean more than mere hunting licenses.

The End Use Code consists of 16 broad bands of use. These bands are:

Military; production and processing of raw materials; construction of new buildings and maintenance of existing buildings; industrial machinery, transportation, communication; public health and safety; agricultural equipment and supplies; food preparation; textiles and wearing apparel; education, recreation and amusement; domestic equipment and supplies; office equipment and supplies; small tools and hardware sold at retail; all other.

Each band of use has a code number, and decimal breakdowns of uses under each number. These code numbers are not preference ratings, but must appear on all orders. No application for a preference rating which does not bear a code number will be granted until preferred attention has been given to coded applications. Ma-



AP Photo

DRAFT CHIEF RELAXES: Brigadier General Lewis B. Hershey, selective service chief, slouches in his chair to read a paper containing the draft numbers and the order in which they were drawn after the close of the lottery on March 18. Eventually men may be drafted for industry.

terial ratings corresponding to the bands of use appear in the code.

There may be coded the amount of any given material cleared by the WPB requirements committee or any WPB branch, one or all producers shipments of any one or all materials during any given period, one or all suppliers' shipments of any one or all materials during any given period.

The object of determining end use is to discover all the indirect ways as well as the direct ways materials flow into the various articles of manufacture, and the amounts thereof.

WPB has in the past tried to get statistical reporting methods into operation which would be current and accurate enough to show whether the priority system was distributing goods and materials in sufficient quantity to war producers, and not piling up surpluses for the

When Minutes Count



Sunoco Saves Production Hours Prolongs Tool Life · Saves Down-time · Minimizes Rejects



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diameter S. A. E. 045 Steel @ 270 R.P.M.

MACHINE— American' ction Lathe

UTTING LUBRICANTpart Sunoco to 20 orts water.

Courtesy of COMPANY COMPANY Speed and more speed . . . production on a scale never before contemplated ... this is the immediate objective of the machine tool industry.

One way to save vital production hours, to increase at once the output of available machine tools and trained manpower, is to put Sunoco Emulsifying Cutting Oil to work. This way is proved. Facts and figures are a matter of record.

Sunoco helps prolong tool life, increases output between grinds, reduces the unproductive time required for regrinding and resetting tools. This modern emulsifying cutting oil minimizes rejects by helping maintain close tolerances and good finish . . . thus saving essential materials and final finishing

Sunoco, and Sun Oil Engineers—those "Doctors of Industry" — are ready to help in your all-out effort . . . to help you step up production, save time, tools and material wherever possible? Write

SUN OIL COMPANY . Phila., Pa.

Sponsors of the Sunoco News Voice of the Air
—Lowell Thomas

IN PETROLEUM PRODUCTS HELPING INDUSTRY HELP AMERICA

military which would paralyze essential civilian industries.

These attempts up to now have failed, and the priorities system has degenerated into a mystifying morass of paper made up of technical devices, orders and certificates, which American business men, both within and without WPB, have struggled to make work. Manufacturers have taken their WPB hunting licenses, and patiently tried to "bag" the necessary goods, but the "game" is just not there.

A "golden array of coruscating adjectives" has been written explaining how the priorities system works, but baffled business men say it will never work except in a hobbled sort of way unless the End Use Code or some similar statistical method is feasible.

Knowlson Empowered to Delegate Rationing to OPA

Washington

• • • J. S. Knowlson, director of industry operations, has been empowered by WPB Chairman Donald M. Nelson to delegate WPB's rationing authority to the OPA whenever such action is considered desirable.

WPB Iron and Steel Officials Appointed

Washington

• • • L. S. Simons has been appointed executive assistant to the chief of the WPB Iron and Steel Branch. He formerly was secretary to the Steel Export Association of New York and lived in Pittsburgh. H. J. French, New York, has been appointed senior technical consultant in charge of the Metallurgical and Specifications Section of the branch. He is a member of the technical staff of the International Nickel Co.

Auto License Tags to be Small Tabs on Old Plates

Washington

• • Automobile license tags hereafter are to be 4-in. date tabs, affixed to old plates, according to order L-52 issued by WPB on March 18. The purpose is to save metal.

No governmental licensing units may use more than 10 per cent by weight of the plates which they used in the year ended June 30, 1941, to replace license plates lost or stolen, for the issuance of new licenses or for making the date tabs

Idle Stack Requisitioned For Removal to Mexico

Washington

• • • Acting under the Requisitioning Act of Oct. 10, 1940, the 350-ton blast furnace of the Mississippi Valley Iron Co., St. Louis, idle since 1926, has been requisitioned by the Board of Economic Warfare and will be shipped to Mexico where it will be operated by the American Rolling Mill Co., as the designated agent for the Nacional Financiera, S. A.

Specialists Appointed in Two Industry Branches

Washington

• • • Appointments of several industrial specialists to serve as section chiefs or consultants in various industry branches supervised by John Kimberly, assistant chief of the WPB's Bureau of Industry Branches, were announced March 18.

Among the appointments were: Farm Machinery Branch—D. H. Pace, vice-president and general manager, John Deere Plow Co., Kansas City, and director Deere & Co., Moline, Ill., and C. E. Frudden, executive engineer, Allis-Chalmers Co., Milwaukee consultants.

Construction Machinery Branch—William M. Parrish, industrial sales executive, International Harvester Co., Chicago, assistant chief.

March Heavy Rail Needs Set at 150,000 by WPB

Washington

• • • WPB's Requirements Committee announced last Friday that heavy rail requirements are 150,000 tons for March. A tentative figure of 1,260,000 tons for maintenance of way for 1942 was set as the limit beyond which the railroads could not expect to get steel.

More Ship Awards

Washington

• • • Contracts calling for the construction of 234 emergency cargo vessels of the Liberty ship class and two shipyards comprising the 34 shipways have been awarded to Higgins Industries, Inc., of New Orleans, and the W. A. Bechtel Co. of San Francisco, the Maritime Commission announced.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



GRINDING for PERFECTION of FINISH and DIMENSIONAL ACCURACY

with FITCHBURG
Automatic Closed
Cycle Grinding

Grinding Splines on Wright Airplane Crankshafts

Continental Motors of Detroit have installed Fitchburg Spline Grinders for grinding splines on airplane crankshafts. These new Fitchburg Automatic closed cycle machines are the culmination of more than 30 years of precision grinding machine development.

No longer is there need to put up with excessive cost of spline grinding by outmoded methods. Fitchburg technique will save on assembly time — divide torque pressure more evenly and produce finishes that will give more even wear on sliding splines at high speed.

The result of using the Fitchburg method is lower costs, higher degree of accuracy, higher speed in operation, and smoother product performance.

New operators can rapidly be trained to produce accurate splines at high speed.

It will not obligate you to mail in your blue prints for study. Write today for catalog showing wide range of other successful applications.



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FITCH BURG GRINDING MACHINE COR

Manufacturers of — Bowgage Wheelhead Units, Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders, Bath Full Universal Grinders and Special Purpose Grinders.

WEST COAST

• Six per cent increase in freight rates falls heavily on Uncle Sam, principal buyer of steel and steel products on the Coast . . . The increases may backfire on the railroads eventually.



SAN FRANCISCO — Delivered prices of steel on the Pacific Coast went higher when 6 per cent was tacked on rail freight rates last week.

Withdrawal of intercoastal freighters, which took place gradually last year and became complete with the declaration of war. forced all steel from Eastern and Southern mills to come across the continent entirely by rail. Under OPA regulations (Price Schedule No. 6) the full amount of rail freight is added to the price at the basing point nearest the mill (or origin of shipment) to determine the delivered price on the Coast. Such "dislocated tonnage" makes up the major portion of steel consumed on the Pacific Coast, and the listed Pacific Coast basing point prices apply only to the small portion rolled in Pacific Coast mills and sold in the immediate districts surrounding them. Even steel rolled in one Pacific Coast district and shipped to another, which formerly sold at the universal Pacific Coast basing point price if competition required it, now takes the basing point price plus actual freight.

The listed Pacific Coast basing point price, which was set before intercoastal water rates took their last two jumps, roughly represents Eastern basing point prices plus intercoastal water freight. In effect, mills not located at seaboard absorbed the cost of transportation to seaboard amounting to from 10 to 18 cents per 100 pounds.

Until last week, the cost of steel to Pacific Coast customers of Eastern mills was from 16.3 per cent to 28.3 per cent over Pacific Coast base prices because of the necessity of paying all-rail freight. When railroad freight rates were increased 6 per cent last week, the cost of steel from Eastern mills became from 18.9 to 31.6 per cent higher than the listed Pacific Coast base. These percentages are for structural shapes, but are representative of other products.

In normal times, this 6 per cent jump in rail rates would have been the last straw to Pacific Coast fabricators and manufacturers. Last week not a peep was heard. The reason was that the principal buyer of steel and steel products on the Coast is now Uncle Sam. In nearly all cases, he will foot the bill. The few private consumers of steel remaining on the Pacific Coast undoubtedly will be allowed by OPA to increase the price of their products accordingly.

Whatever justification there was for the old rail rates, which were computed in the days when considerably less steel was shipped, and whatever justification there was for raising them 6 per cent, delivered steel prices which are 18 to 31 per cent higher cannot help but have an inflationary effect upon the economy of a region. Aside from greatly increasing the cost to the government of ships and war plants, which will reflect it most, such a jump is likely to set off a super-inflationary spiral.

The decision of the Interstate Commerce Commission to allow last week's 6 per cent freight increase shows a sharp difference in reasoning from that followed by the OPA. Many manufacturers have asked the OPA to allow them to raise prices, on the grounds that they have had to raise wages. They have been told that, although their unit manufacturing profit was cut, current volume was so much larger than formerly that they could still make a profit.

Dexter M. Keezer, head of OPA's consumer division, asked the railroads to suspend the rate increases on a number of industrial commodities, including iron and steel scrap and pig iron. He

made no such request for finished steel products, which are far more important to the Pacific Coast economy. The length of haul on iron and steel scrap to Pacific Coast mills, while long in the case of remote sources, does not compare with finished steel coming from Eastern mills. Although all pig iron consumed on the Coast, with the exception of that from Provo, comes from the East, Coast mills operate almost on a complete scrap charge. Thus, the effect of a 6 per cent increase on steel made on the Coast is small. On the far larger volume of finished steel brought from the East a 6 per cent freight increase is more serious.

TO demonstrate the ability of Class I Western railroads to absorb their increased labor costs, Mr. Keezer pointed out that their January, 1942, net operating income had increased 72.3 per cent over January, 1941. When the roads turned down Mr. Keezer's plea for a suspension of the increase on pig iron, scrap, and other non-metallic and nonferrous commodities, it marked the second round the OPA has lost in its effort to keep freight rates down.

Even though the OPA may not be able to prevent rate increases, the increases, the increases, the increases, the railroads. In the days when steel could be brought from the East by water it was as cheap or cheaper to make steel in the East and bring it out by water than to make it on the Coast. With rail freight more than double what the water rate used to be, steel making on the Coast shows a far greater chance of being profitable.

Take the case, for instance, of a shipbuilder whose operations soon may include from eight to ten Pacific Coast yards. Going at full steam, these yards might be expected to build 500 or more vessels a year, each vessel requiring possibly 3000 tons of steel, including driving machinery. On this basis, 1,500,000 tons of steel would be required per year. Operating over a war period of five years, 7,500,000 tons of steel would be required.

The freight bill alone on 7,500,-000 tons of steel, assuming it all was shipped from the Birmingham T PAYS 5 WAYS

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Standardize Standardize THREAD GRINDERS

DESIGN . . . Ex-Cell-O engineers, who introduced precision thread grinding to U.S. industry, are familiar with today's threaded work needs. Ex-Cell-O thread grinders are designed to meet these needs specifically.

2 CONSTRUCTION . . . Ex-Cell-O thread grinders are substantially, compactly built—to give years of service—with base, work table, controls, compartments, etc., all integral parts of a uniform exterior design. Moving parts are made for precision operation. Work table slides, for instance, are heavily ribbed and normalized to eliminate warpage. Hardened, ground and lapped steel rollers support work table on scraped ways. Anti-friction rollers are retained in steel carriers so that table moves with uniform freedom, preventing variation of table drag that would affect accuracy of work.

3 ADAPTABILITY . . . Within the designed capacity of each of nine Ex-Cell-O standard thread grinding machines—automatics, universals, and plain production—a wide range of work is possible. Users of Ex-Cell-O precision thread grinders are finding that on many work pieces more overall speed and economy are attained by precision grinding all threads called for, including even those not requiring the extreme accuracy of grinding.

WIDE VARIETY OF STYLES . . . Ex-Cell-O has developed precision thread grinding to cover the many requirements of American industry for precision threaded work. There are available nine different styles of Ex-Cell-O thread grinders—all standard machines—with greatest practical interchangeability in use of dressers and lead screw and nut assemblies.

5 MADE BY DEPENDABLE FIRM . . . Only one standard is acceptable at Ex-Cell-O—the greatest commercial accuracy it is possible to attain, whether it be in the designing of precision thread grinders or any of the various other precision machines and tools bearing the Ex-Cell-O name.

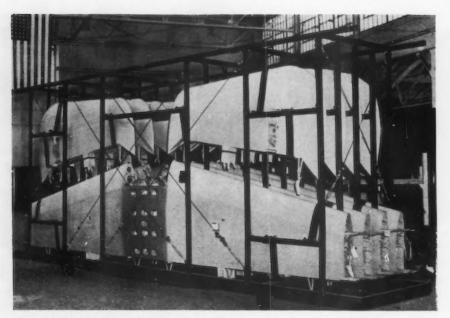
Precision THREAD GRINDING, BORING AND LAPPING MACHINES, TOOL GRINDERS, HYDRAULIC POWER UNITS, GRINDING SPINDLES, BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

EX-CELL-O CORPORATION • DETROIT



Above: Ex-Cell-O Style 39-A... for precision grinding internally threaded work. One of nine styles of Ex-Cell-O standard thread grinders.

BUY
MIED STATES
DEFENSE
BONDS
STAMPS



SHIPPING FRAMES: Steel frame containers developed by Fisher Body Co. for shipping auto body parts have been utilized for shipping aircraft parts to assembly plants. The steel containers, loaded with wings, rudders, stabilizers, and other parts, are more stable and cheaper to ship than wooden crates, and are equipped with rubber mounted "knee-action" casters for loading in freight cars.

or Chicago districts, which are most favorably situated freightwise to the Coast, would be \$8,775,000. In actuality, much of it would come from farther districts raising the total cost of freight to over \$10,000,000.

SSUMING that plates and Assuming that plates and be structural shapes can be made on the Pacific Coast at \$2.10 per 100 pounds, which is the price that they sell for in the East, our big shipbuilder could save close to \$10,000,000 if he made his own steel on the Pacific Coast. He would not save the entire amount. for he would have to transport his steel from his mill to the various points on the Coast at which his yards were located. Ten million dollars does not come close to the cost of building a mill to turn out 1,500,000 tons of steel a year, but it is a very nice down payment, particularly when it represents pure gravy from savings on the freight bill. That is only horseback arithmetic, but it gives a rough idea of the economics by which a big shipbuilder could justify erection of a 1250-ton capacity blast furnace and commensurate steel making and rolling facilities.

Look at it another way: 35 per cent of the Pacific Coast price of every ton of plates or structural steel brought from Birmingham or Chicago all-rail represents freight; 39 per cent of every ton brought from Pittsburgh represents freight; 42 per cent of every ton brought from Bethlehem or Sparrows Point represents freight. The cost of making steel on the Pacific Coast may be high, but as long as freight charges like that enter into the picture, Pacific Coast mills are in a favorable position.

No one seems to worry very much about how high Uncle Sam's costs rise, but he is paying dearly for ships built on the Pacific Coast because of these considerable freight costs. The land grant rate, which is a considerable factor of saving for the federal government on goods transported across the Northern Pacific or Santa Fe lines and to a lesser extent on other lines, does not apply unless the material is actually owned by the government. A shipbuilder or contractor bringing steel across the continent to build ships or buildings for Uncle Sam does not get the land grant rate. The Maritime Commission which is the contractor for most of the ships now being built on this Coast is not entitled to the land grant rate—only the Army and Navy. Even in cases where the Army or Navy supplies the steel it now is being sent the fastest way without regard to possible land grant savings.

In some shipbuilding contracts,

provision is made that the government pays the difference between the water rate and the all-rail rate now that shipments are coming by rail. The government pays in the end, anyhow.

Should it be suggested that Eastern mills absorb a proportion of rail freight equal to the amount absorbed when shipments were made by water or rail and water, it may be pointed out that they were only able to make such absorption because the additional amount of steel sold to the Pacific Coast raised their operating rate and cut their unit costs. Now, with operations near capacity, additional tonnage no longer cuts unit costs, and added volume bring no saving. Ample markets exist at home, and any freight absorptions made would mean loss in revenue. Furthermore, the mills are already absorbing increased labor cost without raising prices.

Apparently through confusion resulting from inauguration of a seven-day week at Henry J. Kaiser's Richmond Shipyard No. 1, Richmond, Cal., 1000 workers of the swing shift staged a "quickie" strike last Wednesday. As this was written, the men were back at work and the trouble appeared to be cleared up.

New Yards and Drydock to Be Built on West Coast

San Francisco

• • • W. A. Bechtel Co., San Francisco, will construct and operate a shipyard on the northwest shore of San Francisco Bay. The yard, which will have six ways, will be built under a Maritime Commission contract. A contract has also been awarded to the Bechtel company for construction of Liberty type ships. W. A. Bechtel Co. has been associated with the Henry J. Kaiser interests in large construction projects.



Seattle

• • • Acquisition of 11 acres for expansion of Todd-Seattle Drydock facilities was made by the government last week. Two new drydocks for repair, conversion, and alteration of vessels, are contemplated. Approximately \$6,000,000 will be spent.

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Fatigue Cracks

Nelson, the Needle

• • • Among the country's current requirements is a good public relations counsel, someone combining the best features of Ivy Lee, the Delphic oracle, the three Walters: Lippman, Disney and Winchell, Dr. Kildare,

and Superman.

We need someone who can read the public pulse accurately, and prescribe and administer the proper medicine to keep it at a steady war-time beat. At the moment we are being fed alternate doses of stimulants and sedatives. While Donald Nelson gives us a shot of adrenalin, other Government spokesmen of the everything-is-coming-along-just-dandy school belabor us with paregoric.

The top management seems to be in doubt as to whether the patient needs scaring or reassuring. We think it is Mr. Nelson who has diagnosed the case correctly that is, that the patient's pulse is still subnormal and needs stepping up. A healthy scare stimulates the adrenal gland, pouring extra strength into the muscles, adding starch to staying power, and banishing

that tired feeling.

And there seem to be no bad after-affects. astonishment of psychiatrists even a sustained state of alarm is not necessarily accompanied by a bumper crop of neuroses. The state of public mental health in England is, we hear, better than in normal times.

A Little Oil Here

• • • Opposed to Donald Nelson's efforts to eliminate lethargy is the complaint of a major Government department head that too much criticism is being leveled at the efforts of management, labor, and the Government itself. We see danger in a blanket indictment of criticism. Captious fault-finding, like adulation, saps the strength, but the constant search for flaws in the war machine should be encouraged.

Pasting a defeatist label on constructive criticism would be like accusing an X-ray operator in the Wright plant of sabotaging the war program for finding a subsurface seam in an airplane engine crankshaft.

We think your favorite family journal is helping win the war by making it known, as it did three weeks ago, that some badly needed aluminum forging capacity was not in full use. Since we published the item, the situation has been corrected, and we like to think we helped.

In the West Coast section of Mar. 12 we reported that two California aircraft plants, one of them a major producer, was working only five days a week. The reasons were cited. In every issue we are chalkmarking spots that need attention.

Such a great, hastily-erected war goods-producing machine as ours is bound so squeak in many places. So we shall continue our weekly inspection and point out where a drop of oil is needed.

That Greek Is Here Again

• • Ergo, a United States marshal, presented Schumak with an order requisitioning his yard . . . —The Iron Age, March 19, page 114

Then there was the fellow who became suspicious when his sweetheart said she ate her breakfast with

Aptronyms

• • • Gordon L. Hall thinks it appropriate that the author "Mathematics for Engineers" should be named

C. G. Conn, Ltd., the band instrument people, wrote us a letter the other day, signed by F. K. Savage. Music hath charms. . . .

New Priority Guide

• • • The new priority guide, the fifth edition, is furnished as a separate section of this issue. To work in the great number of recent revisions, midnight Mazdas have been burning in the brains department since St. Patrick's Day.

If all the complimentary letters we have received regarding the guide were piled one on top of the other they would certainly topple over, and if the hours the 125,000 copies of the guide have saved industry were laid end to end they would stretch out to 1.37 eons. The guide has been heading industrial journalism's Hit Parade ever since last September.

Extra copies may be obtained at these prices:

1	to	10	copies						*			25c.	each
11	to	100	copies									20c.	eacl
101	to	300	copies			×						18c.	eacl
300	or	mor	e copies									15c.	eacl

If you would send stamps or coins with orders for small amounts we would be grateful no end.

Pronunciation Lesson

• • • J. Rowland Cox telephones that President Roosevelt was right in pronouncing decadent deck'-adent. Not according to our drugstore dictionary nor the big one in the brains department. De-kade'-ent is the present approved pronunciation.

L. W. (Security Manufacturing Co., Kansas City, Mo.) says in the same speech he heard F.D.R. pronounce strategic strat'-e-gic. We didn't hear that. Most of our friends pronounce it stra-jet'-ic.

Newton Was Right

Newton Was Right

• • • Man and boy now for six years we have been printing puzzles on this page. Our method is to try a puzzle, and, if we can solve it ourselves, to discard it as being too easy. The only disadvantage to this method is that occasionally one or more members of this page's loyal army of eighteen readers wants to know how the answer was arrived at. Such questions embarrass us, as our puzzle book gives only the answers, so we have to put them up to the master minds.

Most popular of the recent problems was the one Walter (Babcock & Wilcox) Andresen sent in about the 150-1b. man who pulled himself up the side of a building in a bosn's chair, by means of a single rope through a sheave attached to a horizontal beam that would support 275 lb. When opposite a fire escape the man tied the rope to the ralling. He then tried to climb from chair to fire escape, but the beam broke and he fell to the ground.

John Gerda, A. W. Miller, Clement J. Feeny and others explained why the rope broke. C. A. (Hoskins Mfg. Co.) Kinnison even provided a parallel case:

At the Metal Show in Cleveland several years ago, to hang our Chromel neon sign, we strung two strands of about 4-gage wire between two pillars. The sign weighed about 100 lb. To find out if the wire was strong enough to hold it, one of the workmen who weighed about 135 lb. threw a rope over the wire span, pulled the free end down, and raised his feet off the floor, safely. So the gang assumed that the wire would support the sign.

To hang the sign they attached a pulley block to the wire span, hooked on my sign and started to pull. They hoisted it about 6 ft. off the floor—then wham!—it crashed to the concrete—because the span was called on to carry a load twice the weight of the sign.

Stoppers

• • • For the Want of a Seal a Truck was Lost .-Chicago Rawhide Mfg. Co.

Let's Put Our Headaches Together .- American Nickeloid Co.

Last week's mixture was 5/12ths wine. Mark yourself A in mental alertness if you can figure out in less than fifty sec-onds how a farmer divided his property among four sons, so that each part was of the same shape and acreage.



NEWS OF INDUSTRY

Plane Plant Displaces Aluminum With Steel

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• • • Successful application by North American Aviation of a low alloy steel in place of aluminum alloy was announced here. North American combat trainers are already using plywood structures to conserve aluminum, and steel will soon go into the assembly lines.

The steel used contains less than two per cent of strategic alloys, as contrasted with more than 25 per cent strategic alloys in stainless steel. Company officials reveal that North American's advanced combat trainer-which is the standard advanced trainer for the U. S. Army, U. S. Navy, and British R.A.F.-has been adapted to utilize steel and plywood in place of 75 per cent (by weight) of the aluminum alloy parts now used in its manufacture. Wood substitutions account for 250 lb, of aluminum alloys in each plane, while the new steel will replace almost 1000 lb. of aluminum alloy per plane.

Among parts which actual structural tests have indicated can be built with steel, North American lists wings, wing center sections, wing tips, vertical stabilizers, rudders, elevators, flaps and ailerons.

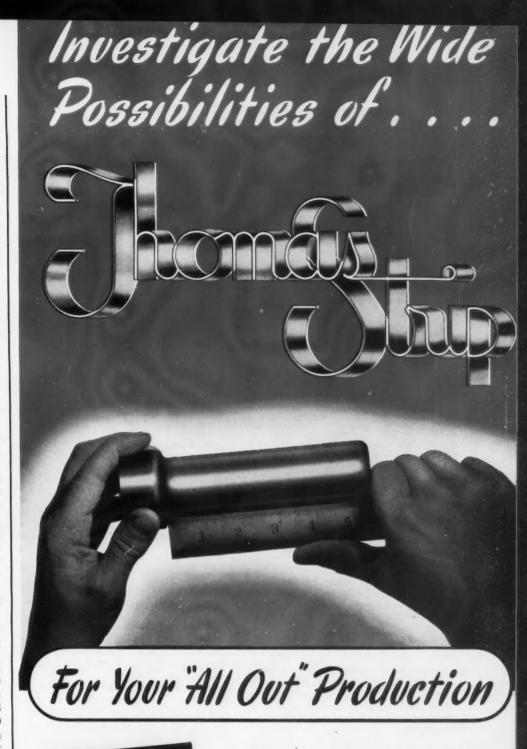
Only disadvantage of the new materials is a three per cent increase in weight.

North American officials pointed out that it is possible to save 1250 lb. of aluminum alloy on each North American trainer, or 623 tons of aluminum alloy in 1000 such trainers—enough aluminum to build 420 modern pursuit planes or 150 medium bombers.

Lockheed 1941 Sales Increase \$100 Million

Los Angeles

• • • Lockheed Aircraft Corp. reported net sales for the year ended Dec. 31, of \$144,728,153, compared with \$44,936,594 in 1940. With Vega Aircraft Corp. sales of \$14,512,197, combined deliveries were \$159,240,351 or more than three and a half times the 1940 delivery. Lockheed's net profits last year were \$6,608,621 compared with \$3,165,675 in 1940. The 1941 net income of Vega was \$807,915. Vega was merged with Lockheed late in 1941.





Electro coated and bright uncoated cold rolled Thomastrip offer wide possibilities for your Victory products. Thomas has had broad experience in meeting a wide range of special requirements, and in consistently duplicating them. Hence, difficult emergency specifications now receive experienced attention. Send sketches, parts, or describe by letter your "all out" products.

THE THOMAS STEEL CO., WARREN, OHIO SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Dear Editor:

PAGING "THE BULL"

Sir:

We would appreciate the privilege of using two or three of J. R. Williams' cartoons (The Bull of the Woods) in our Gun Plant bulletin which we issue to our employees. Will you let us know if you are able to extend this courtesy to us for limited reproduction? The cartoons have a very apt connection with the ordnance work we are engaged in here.

GERALD HELLER

Dominion Bridge Co., Ltd. Vancouver

• The Bull of the Woods is a syndicated feature, handled by NEA Service, 1200 West 3rd Street, Cleveland. We suggest you write directly to NEA for such permission.—Ed.

TUMBLING BARRELS

Sir

Please advise us as to what concern manufactures the tumbling barrels shown on page 61 of the March 12 issue.

R. AUXEL

Royersford Needle Works, Inc. Royersford, Pa.

• The barrel is made by the Baird Machine Co., Bridgeport, Conn.—Ed.

ENCORE FOR KALISCHER

Sir

Have been reading P. R. Kalischer's articles on industrial powder metallurgy with a great deal of interest, and would like to have a reprint of the entire set, if and when they are available.

STANLEY P. WATKINS

Rustless Iron & Steel Corp. Baltimore, Md.

• Demands from readers for extra copies of Kalischer's articles have been so great that we have reprinted the series.—Ed.

PRIORITIES, 5TH EDITION

PLEASE MAIL TODAY SPECIAL DELIVERY TWO DOZEN COPIES FOURTH EDITION PRIORITY GUIDE REQUIRED HERE TOMORROW FOR SALES MEETING. RHINEHART.

Townsend Co. New Brighton, Pa.

 The new, revised edition of the popular priorities guide is published with this issue.—Ed.

ADIRONDACK ORES

Sir:

I enjoyed very much the article in the March 5th issue on the Adirondack ores. As an amateur of iron and steel history, I have a wide interest in good historical jobs such as that.

J. G. MAPES

American Iron & Steel Institute New York

ALLOY ALTERNATES

Sir:

I would like to know how I can secure a copy of the booklet entitled "Possible Alternates for Nickel, Chromium and Chromium Nickel Constructional Alloy Steels," recently prepared by WPB and mentioned in your issue of Feb. 12.

J. VOGLIANO

S.I.A.M. Di Tella Buenos Aires, Argentina

 This booklet was published by the American Iron and Steel Institute, 350 Fifth Avenue, New York. We have asked it to forward you a copy. —Ed.

AIRCRAFT SPECIFICATIONS

Sir:

We would appreciate receiving five copies of the article "Government Specifications for Aircraft Stainless, Carbon and Alloy Steel," which appeared in your Feb. 19 issue, for inclusion in our engineering library.

F. W. DEVLIN

Consolidated Aircraft Corp. Lindbergh Field

HEAT TREATING DATA

Sir:

I am writing in regard to information on treating steel. I have not done any hardening for 18 years and there have been lots of changes. But I am willing to do all I can where ever they need me. So if you can refer me to material on hardening and different makes of steel would be very grateful.

R. BIELLHART

South Bend, Ind.

 Your local public library doubtless has bound volumes of THE IRON AGE, in which will be found complete reports on the growth of the art of heat treating.—Ed.

NO RETREAT BEHIND THE LINES

Sir:

In the March 5th issue you have an editorial entitled "No Retreat Behind The Lines." We should like permission to quote excerpts from this editorial in our shop newspaper or post them on our bulletin board.

F. H. ALLIS

Guide Lamp Division, General Motors Corp. Anderson, Ind.

· Permission granted.-Ed.

STEAM ENGINES AND BOILERS

Zin.

Can you tell us the publishers of the text book entitled "Steam Engines and Boilers," by E. Molloy. We are very anxious to obtain a copy and do not know what source to contact. . . .

H. E. INGWERSEN

Armco International Corp. Middletown, Ohio

• Molloy's book was published by the Chemical Publishing Co., 234 King Street, Brooklyn, N. Y.—Ed.

DRUM ROLLING

Sir:

While at the recent Chemical Show, I saw a machine for which we may have an application in our plant. I do not know the manufacturer's name, but I would like to have some of their literature. The machine I refer to was a barrel rolling or mixing apparatus, rotating on four 8 in. rubber rollers and driven by a small electric motor.

E. G. PETERSON

Victor Ring Traveler Co. Providence, R. I.

 The barrel rolling machine you have reference to was exhibited by the U. S. Stoneware Co., 60 East 42nd Street, New York.—Ed.

ARMY'S GAIN, OUR LOSS

Sir:

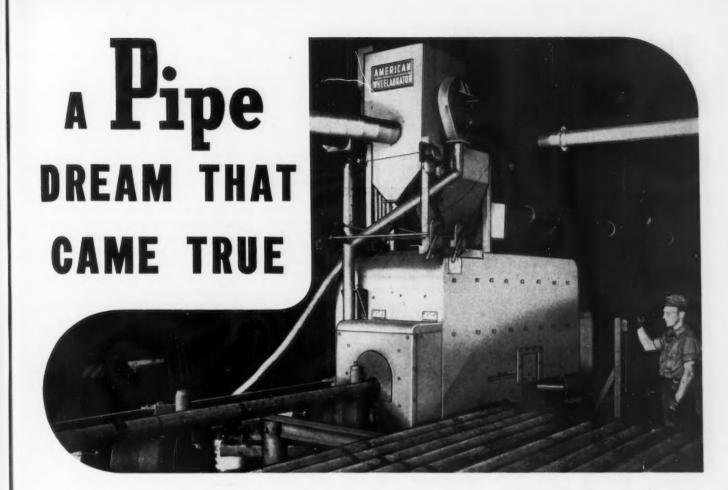
I am sorry to advise that I will be called to the Army within the next few weeks and as I have been the only one to use The Iron Age it will be necessary to discontinue our subscription for the time being.

The publication has been a great help to me during the past two years and I will miss it a great deal.

ROBERT A. PONTON

Paint and Steel Department Farmers Cooperative Exchange Raleigh, N. C.

90-THE IRON AGE, March 26, 1942



In almost every manufacturing step in the production of seamless steel tubular pipe, heavy heat-treat scale is formed.

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This has always been a vexing problem because of high cleaning costs and the difficulty of removing the scale uniformly from the exterior and interior.

To improve this condition the National Supply Co., Spang-Chalfant Div., Ambridge, Pa., came to us with their problem. The job entailed the cleaning of the exterior and interior of low carbon and high alloy seamless steel pipe varying from 2" to 14" O.D. and from 18 ft. to 50 ft. in length.

The successful answer to this problem took the form of equipment which included the airless WHEELABRA-TOR for cleaning the exterior of the pipe, and an air blast for descaling the interior.

This unique combination has effected a cleaning speed and facility of operation hitherto unattained. The equipment, for example, is cleaning $4\frac{1}{2}''$ standard low carbon pipe at the rate of 18 ft. per minute on the exterior and 14 ft. per minute on the interior.

Other pipe sizes are being cleaned at comparable speeds.

A special cabinet, housing two standard WHEELABRATOR blast units, is used for cleaning the outside of the pipe. The WHEELABRATORS, mounted in the bottom of the cabinet, blast upward and in direct line with the rotating pipe as it passes through the cabinet on the conveyor mechanism.

Travel of the pipe on the conveyor rolls through the cabinet is continuous—loading being handled at one end of the cabinet and unloading at the other.

The rolls can be varied as to the number of revolutions per minute and as to the skew angle. In this way it is possible to control the length of time the pipe is held in the blasting area.

As the externally cleaned pipe leaves the WHEEL-

A B R AT O R
cabinet it is
rolled on skids
to the air blast
machine where
cleaning of the
interior is accomplished with

a lance type blast nozzle long enough to blast the entire interior surface of the pipe.

During the blasting operation the pipe is rotated on revolving steel discs. Both the speed at which the pipe rotates and the feed of the nozzle can be regulated to obtain the most effective cleaning.

The air blast tank, and the storage hoppers, are mounted on a steel car which rides on a track. The nozzle travels into the pipe, cleaning as it progresses and the blast mechanism rides forward with it.

The speed of airless WHEEL-ABRATING has settled complicated cleaning problems such as this for more than 1500 plants throughout industry. It is the cleaning process you should investigate for faster production at low cost.



AMERICA FOUNDRY EQUIPMENT CO.
510 S. BYRKIT STREET MISHAWAKA, IND.

This Industrial Week . . .

THE number of hours employees in arms plants will work each week and the pay they will receive to help win the war has become a subject for debate at many points in the last few days.

Since reaching the President's ship-plane-tank goals depends in part on a lengthening of the 40-hr. week, production men in every part of the metal industry are watching the movement toward a 48-hr. week.

For employers and labor leaders and certainly for plant workmen, establishment of a longer week seems little to pay toward saving the United States. One of the first issues to be settled is that of overtime pay, a subject on which WPB Chairman Donald M. Nelson says:

"We are moving as fast as we can toward a seven-day, three-shift operation of our basic war industries. The principle that a man should regularly have the seventh day off and should receive overtime pay if an emergency forces him to work on that seventh day is perfectly sound; but where the seventh day does not fall on a Sunday or holiday I do not think that work on Sundays and holidays, in wartime, deserves extra pay."

No Idle Effort, Says Nelson

In a talk applicable to many employers as well as workmen, Mr. Nelson, speaking more bluntly as the weeks go by, told a CIO conference at Washington that "this is not just an idle effort to get more production, to speed up-this is an effort to produce the weapons that our boys need in Australia, or in Bataan, or in any other place in the world, to fight an enemy that has produced many more than we have for a long period of time. We have to do in a short space of time the most Herculean job. The only way the war can ever be won is through production, and a great part of it is in your hands.

"We are going to see to it that nobody pushes you around," Mr. Nelson told the CIO, "but we are going to see to it that labor doesn't push anyone around either. There are a small number of short-sighted employers at one end of the line; there are a number of short-sighted labor folks at the other end of the line, and I do not propose to see either group taking any advantage of this situation."

As CIO leaders reaffirmed the patriotism of the unions and again took the anti-strike pledge, the union conference declared that "wage increases are necessary to provide for workers the income required to enable them and their families to do the best possible job for the war effort." To workmen in industrial towns, who take their patriotism as a matter of course, constant insistence by CIO leaders that the workmen are "patriotic" was again embarrassing.

Ingot Rate Pushed to 98

This week the workmen in the steel industry helped in pushing steel production in the United States to a new all-time high of 98 per cent of capacity. A two-point advance at Pittsburgh to 99 per cent of capacity, a 14-point advance at Buffalo to 104 per cent, and a 13-point rise to 101 per cent in the South Ohio River area were the chief factors in the gain. The flow of scrap, responding to warmer weather, continues to show spotty improvement and cleared the way for stronger mill schedules.

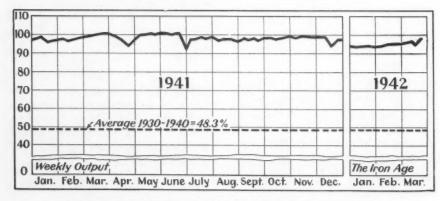
Buffalo's sharp advance followed relighting of four furnaces at the Bethlehem Steel Co.'s plant. While the company's scrap reserve covers only a few days operation, officials believe that present efforts to bring out scrap will provide sufficient material to keep the four additional furnaces in operation. The gain in the South Ohio River area resulted from resumption of melting operations by Andrews Steel Co. The Chicago steelmaking rate is unchanged at 104 per cent, Youngs-

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Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

town down one to 99 per cent; Philadelphia down a half point to 90 per cent, Cleveland off three to 93 per cent, Wheeling unchanged at 83 per cent, Birmingham unchanged at 99 per cent, Detroit unchanged at 94 per cent and the Eastern District nine points higher at 109 per cent.

Appointment by the WPB Bureau of Conservation of a special salvage division is the latest step to get out more iron and steel scrap. This division will attempt to expedite movement of large scrap accumulations which are held up by obstacles such as uncertain ownership, high cost of demolition, remote locations, and other complications. The move is one for which the scrap trade long has hoped. In Canada, all automobile wreckers have been ordered to sell old cars on hand within 90 days.

Orchids to Furnace Crew

For their efforts to lift output of pig iron, another leading raw material in steel manufacture, the 34 members of Crew No. 3 of the Carrie blast furnace, Carnegie-Illinois Steel Corp., Rankin, Pa., have been given a spray of orchids. The orchids (real ones) were presented by Undersecretary of War Patterson for establishment of a world monthly record in pig iron production in January when the stack turned out 41,782 tons.

Another step toward setting up an integrated West Coast steel plant is understood to have been taken with Defense Plant Corp. approval of a \$40 million plate mill to be constructed somewhere in California by Henry J. Kaiser, who recently was given authority to build a blast furnace on the coast. It is reported that there will also be a \$10 million ore and coke development in the West.

Few weeks pass in which steel plates stay out of the news. Additional awards for cargo ships, for shipyard expansion and for new shipyards again emphasize the need for more and still more plates. A monthly plate production goal of one million tons has been tentatively set for the steel industry, but the objective of 900,000 tons a month must first be attained. Already the nation's wide strip mills are producing far in excess of estimated capacity assigned them by the mill's manufacturers. One large strip mill in the Pittsburgh area,

originally scheduled to produce approximately 60,000 tons monthly at capacity, is now operating at a rate of 100,000 tons a month. Strip mills are being required to produce so many plates that the availability of sheets is becoming of serious consequence. Almost all sheet mills are so crowded with plate tonnage that only sheet business carrying an A-1-a or A-1-b rating can be scheduled. Soon all sheet production on high speed mills is likely to represent outright allocation. WPB's iron and steel branch this week requested all plate consumers to conform to certain ordering requirements.

Flaws in the control system under which vital material and machinery are being diverted to the best possible use in the war program are not hard to find, an unavoidable situation when the size and speed of the program is considered. Critics with a desire only to help, note, for example, that tin plate, which today is a strategic material, is being used for some caps and closures, especially screw tops, as well as the tops and bottoms of certain cans, when black plate could be substituted. While not all caps and closures can be made from uncoated black plate, a substantial saving could be made since the cap and closure industry uses approximately 5 per cent as much tin plate as the container industry. Some valuable tin plate is not being conserved because of the length of time being consumed at Washington in drawing up a black plate order.

Tube Mills to Be Under Pressure

Expansion in the number of plants producing bombs is expected to press tube mills for certain sizes within the next three months. Restrictions on non-defense construction are, however, likely to curtail demand for certain types of pipe. Demand for seamless tubing for trench mortar shells has risen sharply.

Standard Steel Spring Co. is the mother company in the widely publicized spring and bumper armor plate combination in which a large number of spring and bumper plants will work on light armor plate orders totaling \$25 million a month. National Tube Co. has announced that bomb production by a new spinning method developed at one of the company's

plants has now reached a point of efficiency where the process can be utilized at other plants for turning out increasing quantities of this weapon.

It will not be long before the War Production Board, for its more efficient operation, divides the country into 12 or more regions, under the leadership of an equal number of regional directors. The directors will be in charge of all WPB field offices and will report to the bureau of field operations in Washington. By such a step the WPB hopes to bring its work and its relations with industry into closer contact.

Maps Specific Approach Plan

In another announcement of interest to the arms industry. J. S. Knowlson, WPB director of industry operations, said that a "specific requirement approach" to the control and distribution of scarce materials will replace the use of general or blanket priority rating orders over the next three months. Companies which have been operating under blanket requirements will be required to apply for priority assistance under the Production Requirements Plan. Earlier, Knowlson issued another warning to industry that priority orders and regulations must be strictly followed. Official interpretations of priority orders are issued only, he said, over the signatures of the WPB director of industry operations, the general counsel, or the assistant general counsel for the division of industry operations.

(To cut away some of the confusion regarding the working of the priorities system, The Iron Age this week issues a new 24-page Priorities Guide. The guide, the fifth edition, appears in this issue of The Iron Age as Section Two. Reprints (at 25c. a copy, less for quantities) can be obtained by wiring, writing, or telephoning to the principal office of The Iron Age, 100 East 42nd Street, New York, or to its branch offices.)

Price developments this week include establishing by the OPA of retail price ceilings on major household appliances, including washers, vacuum cleaners and stoves.

Higher freight rates in effect last week on pig iron, scrap, finished steel and other items resulted in little complaint from the consumers forced to take the absorption.

HERE'S HELPFUL DATA ON ALLOY STEELS



★ For Men On Production Jobs★ For Men In Training Courses

TELL US WHICH WILL HELP YOU AND IT'S YOURS

"Get more production"..." Make every pound of steel and alloys go as far as possible"—those are your first obligations today. We offer you valuable help in handling alloy steels: both where you use them as materials of fabrication, and where you use them as tools. Don't overlook any opportunity to save time or materials—clip, check and mail the coupon now.



HANDBOOK OF SPECIAL STEELS

A comprehensive, 128-page book on the properties, uses and best methods of handling, treatment, etc. of tool, stainless and other alloy steels. Plenty of tables to facilitate quick reference. Conveniently pocket-sized.

Check Here



ELEMENTARY DISCUSSIONS ON TOOL and STAINLESS STEELS

Two informative booklets that give clear and detailed data on the various types, their properties and handling. Excellent for training courses in metals and metal working.

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Oliver Building, Pittsburgh, Pa. T-

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Company

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Plews Gndustry

Production of Liberty Ships On Schedule As Year Ends

• • • Results of the first year of nation's Liberty ship construction program, started by the Maritime Commission with the award of contracts in March, 1941, for 200 emergency cargo vessels, were announced March 18 by the commission. Production of Liberty ships is on schedule up to this time, the announcement states.

During the twelve months the commission contracted for 1456 cargo carriers to be built in 17 new shipyards having 165 shipways, the greatest emergency shipbuilding effort in history. Up to March 15, 1942, keels had been laid for 142 Liberty ships, 61 had been launched and 22 were in actual service. Production schedules have been shortened to about three and a half months from keel-laying to delivery. This compares with average production time of 10 to 12 months for cargo ships during the World War.

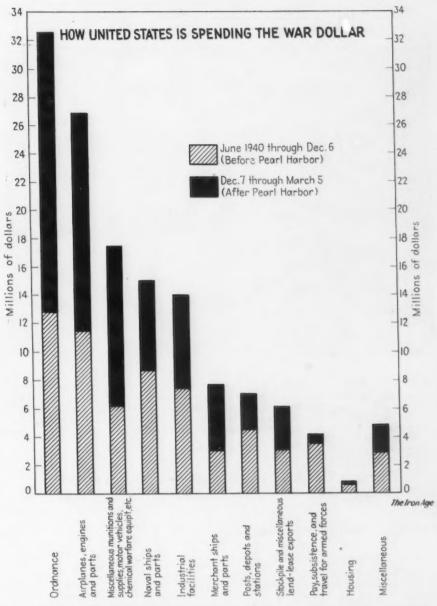
Liberty ship production plans have been expanded four times since the original contracts were awarded a year ago, the present program being seven times that originally contemplated. Ten ship-yards have been added to the original seven set up by the commission for building this one type of merchant ship.

New Shipyard Being Built In Southern Indiana

Indianapolis, Ind.

1

• • • Work has started on the construction of a naval shippard in the southern part of this state. It is said the yard will be built and operated by the Missouri Valley Bridge & Iron Co.



IN THE QUARTER YEAR following the attack on Pearl Harbor, more money was made available for the war effort than in the 18 months preceding, according to WPB data. From June, 1940, until Dec. 7, 1941, Congress appropriated \$64,329,000,000, but from Dec. 7, 1941, through March 5, there was made available \$72,603,000,000, or a total of \$136,932,000,000. Tanks, guns, and ammunition took 24 per cent of the total, while airplanes required 20 per cent. The above table shows how the \$136,932,000,000 was divided.

Buick Bomber Engines Far Ahead of Schedule

Flint, Mich.

• • • Buick-built bomber engines are being produced at the rate originally planned for next December, with production nine months ahead of schedule, it has been announced by Harlow H. Curtice, vice-president of General Motors Corp. and general manager of Buick, in a summary of first quarter operations. He said the originally scheduled 1942 output will be packed into the first six months of this year and that by July the

company will have built more engines than originally were scheduled through the first quarter of 1943.

Output in April of this year is expected to exceed that called for in schedules for April of next year, according to production programs laid down last July.

Plans call for still further expansion of plants and equipment to increase capacity, Curtice said.

Even the endurance test of the engines for the Air Corps was speeded up and accomplished in two weeks, compared with tests which normally consume four to six weeks.





CANADA MATCHES BRITAIN: For the first time in history, Canada this year will build almost as many merchant ships as the United Kingdom. These vessels are 95 per cent Canadian in workmanship and material. The interior of this hull will give an idea of the size of these huge cargo ships, which will help Britain and other United Nations carry the war to the Axis.

1941 Fluorspar Output 37% Greater Than 1940's

Washington

• • • The domestic fluorspar industry was called upon to supply an unprecedented demand in 1941 to meet the requirements of steel mills and aluminum plants, both of which made new production records, and the greatly accelerated needs of manufacturers of glass. enamel, and hydrofluoric acid, according to final 1941 figures made public by the Bureau of Mines. Shipments from mines in 1941, amounting to 320,669 short tons. were 37 per cent greater than in 1940 and 22 per cent more than the previous record (263,817 tons) made in 1918. Sales of imported fluorspar in the United States. however, were 31 per cent less.

Aviation Wage Scale Plan Presented to Nelson

Buffalo

• • • A plan for a universal wage scale in all aviation plants, to be modified only by local living costs, was presented this week to Donald M. Nelson, chairman of the War Production Board, by Leo Kriegbaum, president of an independent union at Curtiss-Wright Corp.

Idle Tools for War Plants Listed by Rhode Island

• • • Machine hours available for Rhode Island war plants seeking subcontractors are given in the table below. The totals are for the week ended March 28. Further information may be obtained from the War Production Board Contract Distribution Service, 530 Industrial Trust Building, Providence, R. I., attention of E. H.

Type of Equipment	Machine Hours
Bending	 750
Boring	 1,156
Broaching	 236
Cutting off	 674
Drilling	 4.401
Gear cutting	
Grinding	 2,346
Lathes	 7.184
Milling	 3,414
Planing	
Presses	 11,352
Screw machines	 1,704
Shapers	 2,406
Tapping	 644
Forging	
Pattern making	380

Pittsburgh Screw & Bolt 1941 Net Is \$1,249,831

Pittsburgh

• • • Pittsburgh Screw & Bolt Corp. reports for the year 1941 net profit of \$1,249,831, after a special charge of \$929,709 in the form of a premium on a group annuity contract. Net earnings were equal to 83c. a share and compared with \$863,617 or 58c. a share in 1940.

Auto Building Equipment Shipped to Outside War Plants Detroit

• • • The distribution of automotive manufacturing equipment to

firms outside the industry but engaged in war work is reported by the Automotive Council for War

Production.

An example cited is a shipbuilding company in Mississippi which is now using welding machines obtained from an automobile body company after the cessation of

auto production.

Another automotive concern recently released a press to an aircraft factory and this equipment is now being shipped across the continent. Two stamping presses have been turned over to a railroad shop in Pennsylvania for work on armored trains and several other presses which were shoved out into snow-covered fields alongside Michigan plants a few weeks ago, now have been shipped to Wheeling, W. Va., for war work.

A firm specializing in hypodermic needles came to the automotive industry to get grinders.

A large forging machine, apparently of the press type, weighing 235,000 lb. stripped to its bare essentials, has been shipped to Milwaukee for military output. This once was used to make automobile wheel hubs and is one of the four machines of this type in the country.

Requests for automatic screw machines and milling machines have reached the auto manufacturers in volume but cannot be filled because of the tremendous demand for such equipment here. On the other hand, there are many types of machines for which there seems to be no demand. These include wire braiding machines once used to coat wire in automotive manufacturing, sewing machines, formerly needed to make cushions and sew upholstery strips. One company has 1500 such machines available but they are considered too light to making army tents and other canvas equipment required by the military services.

Automotive concerns are assisting their suppliers to get tooled up for war work, sometimes furnishing them with necessary equipment. One company has shipped an entire set-up of 15 machine tools to one subcontractor, furnished eight vertical turret lathes

to another.

Only Standard Cars Will Be Given Steel

Washington

• • • Steel will be allocated only for the construction of cars built according to standardized and pooled designs, it was announced last Thursday by Andrew Stevenson, chief of the WPB transportation equipment branch. Seeking to expedite production, a letter he sent to builders said that "all orders for box, hopper, gondola and flat cars during the emergency should be limited to the types and designs" set forth in a study made by the car construction committee of the Association of American Railroads. His request applied to all orders placed after Jan. 1, and also to prior orders on which materials have not yet been received or processed.

The standardized designs, Mr. Stevenson said, will eliminate variations in height, width and length of freight cars used on various railroads, and will result in a general speed-up of production through two channels:

1. Elimination of much of the time required by manufacturers to shift from one design to another, thus freeing more facilities for war work. (It has been estimated that three to seven days are lost whenever a plant makes such a shift.)

2. Reduction of the number of sizes and shapes to be rolled by steel mills, thus making possible faster deliveries and at the same

time increasing the availability of steel production for war goods.

"I am sure every car builder appreciates." Mr. Stevenson wrote. "that the reasons prompting this limitation of designs are twofold: namely, the need for construction of cars as quickly and efficiently as possible with the minimum use of plant facilities and labor so that such facilities and labor may be released for conversion to other types of work vital to defense: and secondly, the advantage of requiring fewer sizes and shapes to be rolled by the steel mills with consequent increased availability of steel production for Army, Navy and Maritime Commission purposes."

500-Passenger Plane Planned For Intercontinental Travel

Cleveland

• • • A giant 500 passenger plane that can fly from Cleveland to London in ten hours is planned and will probably be built after the war, A. R. Horrocks, public relations counsel for Goodyear Tire & Rubber Co., told members of the Foremen's Club of Greater Cleveland on March 16. This, he said, is an example of the projects which will lead the nation into a new industrial age. With only seven per cent of the world's population, he added, we have more than 52 per cent of its manufacturing capacity, in contrast to Germany, which has less than 18 per cent.

United Engineering Backlog To Take Year's Production

Pittsburgh

• • • • The backlog of unfilled orders at United Engineering & Foundry Co. is in excess of any in its history, requiring a constant production effort beyond the end of 1942, according to George T. Ladd, president. To meet existing requirements, continuous operations are being maintained on a seven-day week schedule.

Net earnings for the year ended Dec. 31, 1941, were \$3,309,297, compared with \$3,724,460 in 1940. Mr. Ladd said taxes were almost double those of the previous year and were equivalent to 59 per cent of the company's total earnings.

The company has spent substantial amounts for emergency buildings, expecting to charge it off during the emergency period. Excursions into the strip processing field, Mr. Ladd said, have resulted in semi-continuous pickling lines, strip galvanizing equipment, and electrolytic strip tin plate installations.

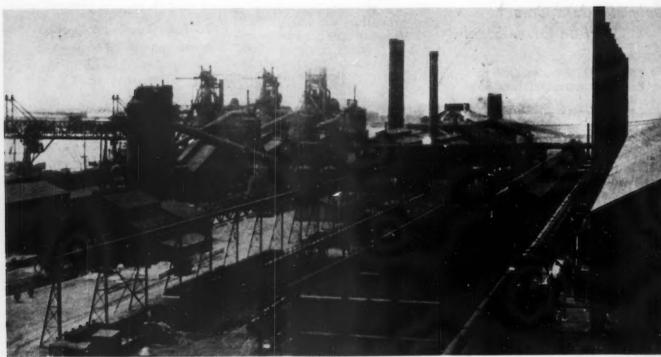
Pilgrim Ordnance Co. Formed

• • • National Fireworks, Inc., has started construction in Massachusetts of a magnesium powder plant to be known as the Pilgrim Ordnance Co. Cost will run into several hundreds of thousands of dollars.

ARMAMENTS AT PLYMOUTH: Three weeks after the picture on the left was taken, showing three cars a minute coming from Plymouth's assembly line, the same assembly line, shown at right, was in production of parts for guns, tanks, and airplanes. The photos were made from the same spot, one on Jan. 30, and the other on Feb. 20.







British-Combine Photo

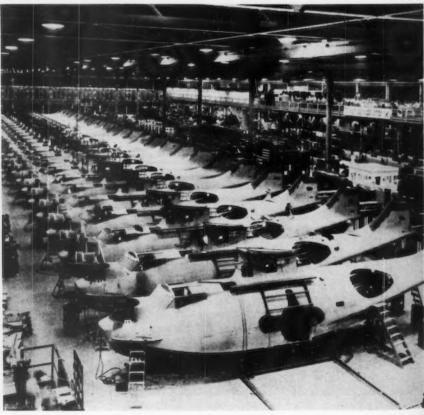
AUSTRALIAN INDUSTRY: This photo of blast furnaces and scrap yards of a New South Wales steel plant shows that Australia, too, is an arsenal of democracy. Here, industries are almost completely converted to war needs.



CONDENSER ROTOR IN THE MAKING: This 192,500 lb. ingot, being placed in a press at Allis-Chalmers Mfg. Co., was heated for two weeks to bring it to a 2200 deg. F. working temperature. It is 76 in. long and believed to be the largest ingot ever forged in the Middle West. Ultimately it will become a rotor for a large synchronous condenser.

EYES OF THE FLEET: The first mechanized assembly line for the construction of flying boats was installed for the production of Consolidated PBY's known in Britain as the Catalina. With a flying range of over 4000 miles at a speed of 200 mph., these ships have been useful for over land and sea operation. One was instrumental in the sinking of the German battleship, Bismark, some months ago.

Acme News Photo





AP Photo

RESIGNS WPB: Robert R. Guthrie declared in Washington on March 19 that the decisions of "dollar-a-year" men in the WPB are frequently prejudiced by their personal interests. He is shown here before a House investigating committee explaining his resignation as chief of the textile, clothing, and leather goods branch of WPB.



MANPOWER CONVERSION: A former automobile salesman, L. C. Williams (right) is now an inspector of aircraft engine sub-assemblies at the Packard plant. The auto industry is meeting the demand for increased personnel in this manner, converting salesmen, mechanics, and other auto workers into trained armament builders.



AP Photo

JEEP TAKES TO THE AIR: Many have been the photos of Jeeps traveling through mud, water, rough country, over hills, and through forests, but now the Army is teaching the Jeep to take the "sky route." When this 1/4-ton Jeep came to an impassable ravine, the coast artillerymen at Fort Sheridan, Ill., under Captain Steve J. Meade, rigged up this overhead cable arrangement and pulled it across.

NEW AIRCRAFT PLANT: When the new aircraft parts factory of Thompson Aircraft Products Co. was dedicated on March 18, just 11 months after excavation was started, ceremonies included a parade through the plant. The plant was DPC financed, and will begin production immediately on aircraft parts and sub-assemblies.



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SPECIAL SURPLUS STOCK STEEL RIM PULLEYS An unusual opportunity! Over 1,200 Items. Complete list sent on request.

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MEDART

Tubular Products, Inc., New Subsidiary of U. S. Steel

••• The creation of Tubular Products, Inc., a new subsidiary company, has been announced by U. S. Steel Corp. The new company, which will begin operations shortly, has acquired the existing plant of National Tube Co. in the Chicago district at Gary.

Benjamin F. Harris, president of National Tube, will be president of Tubular Products, Inc. E. N. Sanders is vice-president of the new company with headquarters at Gary. The other officers, who will also have their headquarters at Gary, are: A. Gordon Patterson, secretary and treasurer; E. M. Moore, comptroller; R. W. Wire, manager of sales; L. W. Mason, manager of purchases. All of these officials formerly held positions in the National Tube and assisted in the development of new plant facilities, such as the establishment in 1940 of bomb and shell manufacturing plants.

Principal products of the new company will be stainless and alloy tubing for the Army, Navy and Maritime Commission, including tubing for aircraft structures, motor parts, bearings, tank tractor tubing, oil refinery tubing, and many other applications.

Coleman Sellers, 4th, Missing After Naval Battle

• • • Ensign Coleman Sellers, 4th, of Ardmore, Pa., was reported among those missing with the cruiser U. S. S. Houston in the battle of Java. Sellers, 24 years old, is the son of Coleman Sellers, 3rd, a descendant of the founder of Sellers Mfg. Co., Philadelphia, a large producer of machine tools. Ensign Sellers was graduated from the U. S. Naval Academy in 1940.

WPB May Cut Lath Output Washington

• • • WPB's Building Materials Branch is considering an order to conserve sheet steel by curtailing the output of metal lath and accessories, as the outgrowth of a meeting last week with makers of metal lath, who used about 150,000 tons of sheet steel and smaller quantities of zinc in 1941. Conversion of strip mills to plate production, it was pointed out, has caused increased pressure on the sheet supply.

OF

COMING EVENTS

March 26 to 28-American Society of Tool Engineers, annual meeting, Hotel Jefferson, St. Louis.

April 14 to 17—Packaging Exposition and Conference, Hotel Astor, New York.

April 15 to 17-Open Hearth Conference, Cincinnati. April 15 to 18—The Electrochemical

Society, spring convention, Nashville, Tenn.

April 18 to 24-Foundry and Allied

Industries Show, Cleveland.
April 20 and 21—American Zinc Institute, 24th annual meeting, stitute, 24th annual Chase Hotel, St. Louis.

April 20 to 24-American Foundrymen's Association, Cleveland.
April 27 to May I—American Mining

Congress, Coal Show, Cincinnati. May 4 to 6—Triple Mill Supply: Southern Supply & Machinery Distributors Association, National Supply & Machinery Distributors, and American Supply & Machinery

Manufacturers, Hotel Traymore, Atlantic City, N. J. May 11 to 13—American Gear Man-ufacturers Association 26th annual convention, Hershey, Pa.

May 19 and 20—National Metal Trades Association 44th annual convention, Biltmore Hotel, New

May 25 to 28-National Association of Purchasing Agents Convention, Waldorf-Astoria Hotel, New York. June 21 to 25 — American Water

Works Association, Chicago. Aug. 23 to 30-National Association of Power Engineers, New Orleans. Sept. I to II—Building and Con-

struction Trades Council, Atlantic

City, N. J. Oct. 5 to 9—National Safety Con-Association, International convention, Baltimore.

Oct. 12 to 16-National Metal Con-

gress and Exposition, Detro::.

Nov. 30 to Dec. 5—National Exposition of Power & Mechanical Engineering, 6 New York. Grand Central Palace,

Indiana Auto Dealers Have Much Usable Equipment

Indianapolis, Ind.

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• • • Indiana's automobile dealer shops have a total of 5700 skilled mechanics who could be utilized for war production, a survey shows. The state's 1262 dealer shops have 460 lathes, 30 shapers, 340 electric drills, over 1000 grinding machines, 1340 welding units, 1100 buffing machines, 1360 spray units, 40 milling machines, 2400 portable drills and other equipment. Combined, these shops have a total of 8,850,000 sq. ft. of floor





ROUND HIGH AND LOW CARBON COMMON AND SPECIALTY WIRES

Hard Drawn, Soft Annealed or Tempered, in all Finishes-Bright, liquor Finish, Coppered, Tinned, Galvanized.

> FLAT HIGH AND LOW **CARBON AND** SPECIALTY WIRES

Hard Rolled, Annealed, Scaleless Tempered; Tempered and Polished, Tempered, Polished and Colored; Various Finishes-Bright, Tinned, Coppered, Hot or Electro

SHAPED WIRES

Various High or Low Carbon Shaped Wires such as: Shaft Casing Wires, I Beam Sections, Space Block Wires, Square, Keystone, Oval, Half Oval, Half Round, etc. Typical of the special steel wires made by Roebling for specialized uses is this shoe pattern edging. It adheres closely to the "jig saw" outlines of complicated shoe patterns, and guides the knife that cuts the leather.

Whether your wire requirements call for special shapes, special analyses of steel, or unusual tempering or finishing, Roebling can meet them. Roebling experience, personnel and closely controlled steel making facilities solve all

the problems of unusual specifications, as you want them solved.



JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY · Branches and Warehouses in Principal Cities



1821 READING ROAD

CINCINNATI, OHIO, U.S.A.

Survey Uncovers Many Machines Available in Garages

• • • More than 18,000 lathes, 15,-000 grinding machines, 1400 shapers, 16,000 drilling machines, 52,-000 welding units, 40,000 buffing machines, 1600 screw machines and 4200 spray painting units are available for war work in garages and automobile dealer shops throughout the country, according to a survey recently undertaken by Willys-Overland Motors, Inc., and summed up in a report presented to the WPB on March 10. In January. Willys-Overland sent out a war production facilities questionnaire to 40,537 dealers throughout the country. The figures of available equipment quoted are projected estimates based upon replies received from 4131 dealers, or roughly 10 per cent of the total.

As a result of this survey, engineers estimate that if all the existing equipment in dealer shops could be pooled, a hypothetical arms factory of more than 25,000,000 sq.ft. could be constructed. The machinery and equipment has an estimated value of \$500,000,000 and could be used to manufacture many types of armament parts not requiring the highest precision.

The tabulation breaks down the equipment by types and sizes and by states. New York reported the largest single supply of facilities available in a single state and New York City listed the greatest amount of equipment available in a single urban area, with Chicago, Philadelphia, Boston, Minneapolis, Baltimore, Los Angeles and Denver among the highest to report. The survey shows that much of the machinery available has been built by leading machine tool builders.

A copy of this survey and additional details may be obtained from Department 100, Willys-Overland Motors, Inc., Toledo, Ohio.

New England Shipyard Three Months Ahead of Schedule

• • • Navy Department and Bethlehem Shipbuilding Corp. will complete a new shipbuilding plant in Massachusetts at least two and possibly three months ahead of schedule. The Foundation Co. of New York has practically completed all preliminary work.



Harris & Ewing Photo

SPEED ARMS PRODUCTION: In an effort to speed arms production, the WPB has sponsored the formation management - labor committees in plants of 2500 prime contractors. In connection with the drive, posters, of which this is the first, will be distributed for display in the plants.

Paper Replaces Metal Lipstick Containers

Buffalo

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• • • Lipstick and other cosmetic containers formerly made of metal soon will be replaced by a special paper-and-plastic material, the F. N. Burt Co. announced this week. Officials revealed an order for 1,000,000 of the new lipstick containers and a large quantity of paper-and-plastic compacts and vanities. The company also is experimenting with paper bottle caps for screw-top cosmetic containers. Cost of the lipstick containers will be less than the ones formerly used.

American Agile Co. Expands

Cleveland

• • • The American Agile Co., manufacturers of welding rods, announces that a large expansion of its plant is now completed, quadrupling the company's output. Installations include hydraulic equipment.



Less Fatigue • Power Driving • Fewer Operations = 50% Less Assembly Cost with Phillips Screws

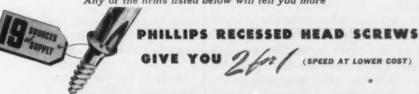
Yesterday - slow, painstaking slotted screw driving with plenty of muscle and plenty of care to see that the driver blade stayed in the slot. Plus plenty of time per assembly charged on the cost sheet.

Today - fast driving with the Phillips Screw that clings to the driver and prevents driver slippage. Faster driving methods are safemore jobs where electric and pneumatic drivers can be employed. In the average case, Phillips Screws cut assembly time in half!

Add up the savings-this 50% reduction in time, the better work done by men less fatigued, the elimination of extra operations (including refinishing scratched surfaces), the freedom from crooked screws and split screwheads-and you'll find you have a 50% saving in assembly cost as well as valuable assembly time.

Please your men and your cost accountant by changing to Phillips. They are easy as pie to drive - and make every assembly dollar do twice the work.

Any of the firms listed below will tell you more



WOOD SCREWS · MACHINE SCREWS · SHEET METAL SCREWS · STOVE BOLTS · SPECIAL THREAD-CUTTING SCREWS . SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343: 2,046,837; 2,046,839; 2,046,840: 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.

The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, III.
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Striatin, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
Whitney Screw Corp., Naw Striator, Conn.
Whitney Screw Corp., Naw Marken Bott & Muser Bott & Waterbury, Conn.
The National Screw & Mfg. Co., Cleveland, Ohio
Whitney Screw Corp., Nashua, N.H.

A Boltmaker Bolts

Pittsburgh:

■ The hammering clank of heading machines, the whir of threaders, screw machines, shavers and grinders in the metal fastener industry have taken on an even higher pitch as productive capacity strives to meet the President's quota of armament.

No . . . bolts, nuts and rivets are not armament, but . . . not a tank rolls, not a battleship floats, nor aircraft flies that doesn't contain these metal fasteners in hundreds of vital points. Many of these are



... part in 36 hours.

Oliver Iron and Steel Corporation products and because you need them, Oliver "bolts" into top speed production . . . enlarges every needed facility . . . adds manpower . . . gets set to serve the Victory Program and your requirements to the best interest of the nation.

A recent lend-lease order . . . scheduled for delivery in 5 months, became crucial material due to the turn in the war. A cable from the foreign Purchasing Commission brought partial shipment in 36 hours . . . final shipment in 30 days. Oliver Iron and Steel is fulfilling and will meet the united nations' demands and is doing everything in its power to speed America's War and Victory Program.



NEWS OF INDUSTRY

"Production for Victory" Group at Weirton Steel

Weirton, W. Va.

· · · The Weirton Independent Union and the Weirton Steel Co. have formed a "Production for Victory Committee of the Weirton Steel Co," in line with Donald M. Nelson's request for joint labormanagement groups.

The committee is composed of an equal number of representatives of labor and management. The general committee which will direct the "Production for Victory" campaign is composed of 12 men, headed by J. S. Williamson, co-chairman for management, and L. S. Lafferty, co-chairman for labor.

In addition to the general committee, the Weirton Independent Union has designated the 97 stewards to act as sub-committees, and the company has designated the respective supervisory heads of departments as their representatives on the sub-committees.

Earnings Up Slightly for Steel Co. of Canada

Toronto

• • • Steel Co. of Canada, Ltd., in its report covering the year 1941, showed net profit, after all charges, of \$4,379,353, equal to \$6.17 per share, compared with net of \$4,-264,384 or \$5.92 per share in 1940. As of Dec. 31, the company showed current assets at \$25,313,-990 up from \$22.943.709; and current liabilities of \$8,969,361 against \$7,777,901, leaving working capital at \$17,771,471 at the end of 1941 compared with \$15,-165,808 at the close of the year immediately preceding.

Ross H. McMaster, president, made no announcement regarding the increase of \$5 per ton which now prevails among other Canadian steel producers. His company has made no advance.

Sheets in Demand for **Emergency Airports**

Chicago

• • • Steel mills here are getting more orders for sheets to be used in the construction of emergency airport landing grids. The grids are made in sections and can be laid down quickly on ground surfaces which would otherwise be impossible to use for landings. They can be picked up easily and moved.

Grips for the Navy

Somewhere in the Pacific

■ With a "wham" that makes thunder sound like a toy bass drum, the U.S. Navy lets go a salvo of 16-inch rifles. Concussion sweeps the decks like a hurricane and screaming projectiles soar miles to the objective. With each recoil the giant ship rolls, hesitates and quickly rights itself . . . every plate, angle and stringer shocked but sound.

Oddly enough the strength of this mighty sea warrior and much of its capacity to give and take battle punishment is directly dependent



on the common bolt and rivet. We seldom think of these metal fasteners as playing an important part in Victory, yet millions of pounds of rivets, bolts, nuts, washers, cold headed or forged lugs, clips and fasteners in hundreds of shapes and sizes go into the building of warships. They are the vital links that join structures so quickly, grip so dependably and install so economically.

Like the man behind the man behind the gun . . . Oliver Bolts, Nuts, Rivets and Fasteners receive little of the praise . . . yet do a vital job exceptionally well. Take a tip from the toughest performance requirements in the world, look to Oliver Products for a sound answer to metal fastener problems and prompt attention to every essential requirement.

PITTSB/URGH, PENNSYLVANIA BOLTS ... NUTS ... RIVETS STEEL FASTENERS

2 Stacks Being Moved And 2 Will Yield Parts

Pittsburgh

• • • A subsidiary of the U. S. Steel Corp., it has been learned, is dismantling two of its blast furnaces which have lain dormant for some time and they are being moved to other locations where they will be recreted and in actual operation before the year is out. This project will save in materials and time.

At the same time, Carnegie-Illinois Steel Corp. is dismantling two non-operative blast furnaces in the Pittsburgh district in order to provide essential parts to other blast furnaces now existent in the district. The availability of these parts from the old furnaces will make possible a rapid expansion in pig iron capacity at the other furnaces in the Pittsburgh district by approximately 400,000 tons a year.

Silver-Lead Alloy Used In Collapsible Tube Manufacture

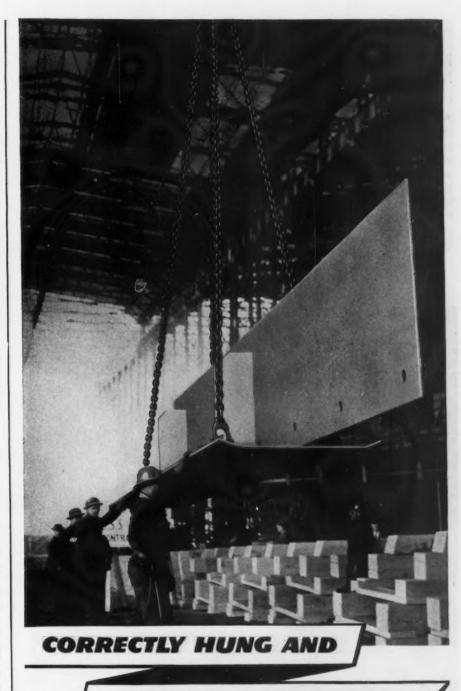
Toronto, Ontario

• • • To meet the shortage of tin used in packing foods and other commodities, Canadian manufacturers of collapsible tubes in December started using a new leadsilver alloy, according to the Toronto Financial Post. Tin supplies to the collapsible tube industry were cut to 12 per cent of their 1941 supply by government action, but manufacturers claim they can get along with these suplies. Their only fear is that even this limited amount will be cut off. The new alloy, being very low in silver content, is not expected to increase the cost of the consumer product in which it is packed. Canada's normal tin consumption is about 6000 tons annually.

Apex Electrical Output To Be Entirely for War

Cleveland

e • • C.G. Frantz, president of Apex Electrical Mfg. Co., announces that the company's plants will be entirely devoted to war work within a few weeks, when practically all production of washing machines, ironers, and vacuum cleaners by the company will cease. Mr. Frantz said "we have orders for war products in excess of \$20,000,000." The company's facilities were recently expanded.



PROPERLY CARED FOR

★ The chain here being used to lay the keel of a fighting ship will last a long time. For it is adequate to the load. It is correctly hung. It has been properly cared for. Such intelligent use of chain pays ample rewards in the conservation of the lives of men, of valuable materials and the chain itself.

If you wish counsel on how to use your chain safely, economically and profitably, we shall be happy to give you the boiled-down experience of years of chain manufacture, application, maintenance and repair.

AMERICAN CHAIN DIVISION . YORK . PENNSYLVANIA

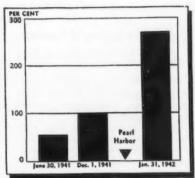
AMERICAN CHAIN & CABLE COMPANY, Inc.

Railroad Executive Cites Need for Supplies

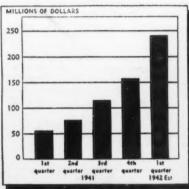
Chicago

• • • The railroads cannot meet the demands of war transportation of industrial goods unless they get adequate supplies of maintenance and repair materials, according to Edward Flynn, executive vice-president of the Burlington railroad. "There is little reason in erecting plants for tanks, guns and planes

unless transportation is available to feed raw materials to these plants," Flynn said. Contending that the roads are making maximum use of their present equipment, the official pointed out that the Burlington increased freight miles per car per day from 43.5 in 1940 to 49.1 in 1941. Flynn said the freight car building program is running behind schedule for lack of steel and that it is getting increasingly difficult to obtain materials for maintenance and repair.



GM War Production Responsibilities



CM War Materials Deliveries

GM WAR PRODUCTION MOUNTS: The top chart shows the rapid rise in General Motors war production responsibilities following the Pearl Harbor attack. Based on all projects under study or under contract, GM's war responsibilities multiplied 23/4 times in the 60 days following Dec. 1, 1941. Deliveries, shown in the lower chart, are likewise rising and will reach progressively higher levels in the coming months. Fourth quarter shipments totaled \$158,000,-000, up 37 per cent from 3rd quarter deliveries.

that you've dreamed about

Investigate GARDNER PRECISION GRINDING-WRITE FOR DESCRIPTIVE BULLETINS

THAT'S the kind of accuracy YOU GET with Gardner PRECISION Double Spindle Grinders!

Look at the roller bearing rollers in the accompanying illustrations. They are ground on a No. 125-23" PRECISION machine, designed throughout with but one thought in mind - ACCURACY!

This tool has a capacity for rollers from 3/8" diameter up to 11/8" diameter. They are loaded by hand into a rotary-type work carrier, and after passing between the abrasive wheels, are ejected by an automatic "kick-out". Two cuts are taken, the first removing approximately .006" overall stock, and the second, .002"-.003" overall.

These rollers are ground at 30 to 40 per minute, PER CUT, and are held within .0004" to .0005" for parallelism, and .0006" to .0008" for uniformity.

And THAT'S ACCURACY!

GARDNER-GRIND YOUR Flat SURFACES MACHINE COMPAN 412 East Gardner Street * * * * Beloit, Wisconsin, U.S.A

Only Minimum Needs Given Canadian Roads

Ottawa

· · · According to announcement in government circles, steel is being made available to meet minimum requirements of Canadian railways, but no steel has been granted for new equipment. Municipalities have not been refused steel for street cars or for other requirements which are essential and for which no satisfactory substitute is possible. According to information gained from other reliable sources, it is understood that when the plate mill at Dominion Steel & Coal Corp., Ltd., goes into operation next month, its first production will go to builders of railroad rolling stock to enable these companies to proceed with old orders and provide cars urgently needed.

Great Lakes Navigation Season Gets Underway

• • • The navigation season got underway in the Detroit area on March 15 with the arrival of a Gulf Refining Co. tanker bringing cargo from Toledo to Detroit and the movement of a Ford Motor Co. tug and coal barge between Detroit and Toledo.

Ore Consumption Eases

Cleveland

• • • The ore shipping season started here with the boats of the Cleveland-Cliffs Iron Corp. again leading the way in heading for the Upper Lakes in the wake of icebreakers. The ships are 12 days earlier than the start in 1941 and the earliest in the history of lake ore shipping.

Iron ore consumption for February declined to 6,403,362 gross tons from the 7,158,423 gross tons consumed in January, with the drop being a natural effect of the shorter month in February. However, the heavy rate of consumption may be reflected in the fact that this year's February consumption was over 13 per cent above the 5,673,166 gross tons consumed in February, 1941. On March 1, 1942, 22,986,559 gross tons of ore were at U.S. furnaces. 848,605 gross tons were at Canadian furnaces and 3,690,658 gross tons were at U.S. Lake Erie docks. Total stocks of 27,525,822 gross tons on that date were down from 33,919,063 gross tons of a month ago, but were higher than the year earlier total of 24,195,165 gross

Dry Blast to Be Installed for Republic in Alabama City

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• • • Surface Combustion, Division of General Properties Co., Inc., has been awarded a contract for a Kathabar Moisture Control System for furnishing dry blast to the new blast furnace of the Republic Steel Corp., Alabama City, Ala.

Officials have estimated that the 10 per cent increase in furnace capacity, due to the application of the dry blast, will supply in one day's time material equivalent to that used in the equipment.

DELIVERIES ON TIME! CRANES FOR INTERMITTENT SERVICE





Whether it's "thru the air" for long distances, or "spot handling" around machine tools, you can count on P&H Hoists to deliver quickly, smoothly, safely. Not a late delivery in 6 months . . . that's P&H's record, and Honesty is still our policy. Just ask P&H engineers to show you how you can gain this advantage, or write us direct.

General Offices: 4401 West National Avenue, Milwaukee, Wisconsin



Missouri Pacific to Buy 60,000 Tons of Rails

St. Louis, Mo.

• • • The Federal Court at St. Louis has authorized the Missouri Pacific Railway to buy 15,000 tons of 112-lb. rails to be applied in 1942, and 45,000 tons of 112 and 90-lb. rails to be applied in 1943. The 1942 rails will cost \$645,000.

Ohio Forge's Shipments Rise

• • • • A 65 per cent rise in shipments for 1941 is reported by Ohio Forge & Machine Corp., manufacturers of gears, special machinery and drop forgings. The company's report states that unfilled orders at the end of 1941 were 210 per cent of the Jan. 1, 1941, total, and practically all of the orders on hand are for war equipment. The company reported a net profit of \$543,113 for 1941.

Milestones of Industry

• • • E. P. Bullard, Jr., president of The Bullard Co., Bridgeport, Conn., and inventor of the Bullard vertical turret lathe, the Mult-Au-Matic, and the Contin-U-Matic, on March 10 marked the 50th year of his active participation in the firm founded in 1880 by his father, who was recalled from the Northern Army in the Civil War to make pistols at the Colt plant in Hartford.

Eighteen associates whose service totals 786 years, greeted Mr. Bullard on his golden anniversary as an industrialist.

Blueprint Reading Films Use New Teaching Method

• • • A practical new method of training machine shop apprentices in blueprint reading is introduced in a new two-reel sound film just completed by Film Productions Co. of Minneapolis. The film introduces a greatly simplified technique of blueprint reading called the "Read - Check - Read" system that enables the average shop mechanic to grasp fundamentals more quickly. It shows how key sections of typical blueprints can be visualized in terms of completed parts.

By animated drawings and special photographic effects the new film shows many things that are difficult to explain in a text or by personal instruction. An instructor's text outline, however, is supplied with the film.

Reynolds Subsidiary Mining Domestic Bauxite

• • • Active mining of domestic bauxite has been commenced by a subsidiary of Reynolds Metals Co., according to announcement by R. S. Reynolds, president. Bauxite from Arkansas deposits, now being mined by the Reynolds Ore Co., will be shipped to the Alabama aluminum plant of Reynolds Metals. Using bauxite from domestic sources releases ships that otherwise would be required to bring this mineral across the sea, and in some degree also cuts down the rail haul required to bring the ore to the plant. The Reynolds Metals Co. was the second concern in the United States to start production of virgin aluminum.

When You Need Heat Quickly...



This Heater is a self-fired unit containing its own combustion chamber as well as the motors and fans to circulate warm air in the space to be heated. It is available for quick delivery in sizes from 700,000 B.t.u. to 1,500,000 B.t.u. One or more heaters of this type can be arranged so as to provide required working temperatures for any size or shape of industrial building. Such a system is much faster to install than a central steam plant and the cost is frequently quite a bit lower, since there is no need for a distribution system of pipes, radiators or diffusers.

of pipes, radiators or diffusers.

Heaters are on hand in stock sizes and can be shipped and installed quickly.

Fuels are gas, light and heavy oil or coke oven gas. At the snap of the switch, the warm air starts in circulation. Its high heat transfer efficiency, up to

85%, makes it economical to operate.

These heaters can be installed and connected up in a building that is under construction . . . used for temporary heat and then retained as a permanent heating system.



There are three ways to determine if this heater will answer your problems: (1) Refer to Sweet's

Catalog; (2) Or write and we will mail you our catalog; (3) Or if you would care to have a sales engineer analyze your problem, without obligation, of course, include request when writing.

DRAVO CORPORATION

Machinery Division Heater Department
DRAVO BUILDING · PITTSBURGH, PA.

4800 Prospect Ave. Cleveland Broad St. Station Building Philadelphia

War Contracts Awarded

• • • Below is a New York State list of government contracts recently awarded, some of which may require subcontract work. If you are a New York state manufacturer and are interested in obtaining work on a subcontract basis, write, don't telephone, your nearest WPB Contract Distribution office. In making inquiries concerning any of the following items, please refer to the letters and numbers given in the second column.

Contract Item	Firm
Tugs, harbor, small	NAM-902
Generator sets, diesel	
Equip., refrigerating	
Anchors, cast steel	
Busses	
Generator sets, diesel	
Anchors, cast steel	
Steel containers	
Generator sets	
Compressors, air	
Cable, electric	NAM-916
Cable, electric	
Cable, electric	NAM-918
Cable, electric	
Cable, electric	NAM-920
Cable, electric	NAM-921
Electric cable	NAM-922
Generator sets, diesel	NAM-923
Chains	
Chain cable	NAM-926
Truck crane	
Buoys	
Generator sets, diesel	
Containers	NAM-930
Engines, diesel	NAM-931
Tugs	NAM-932
Tugs	NAM-933
Nickel-copper alloy:	NAM-937
Tin, ingot	NAM-938
Tin, ingot	NAM-939
Tin, ingot	
Forgings	NAM-1001
Taps, hand	NAM-1005
Diesel engines	NAM-1007
Amplifier equipment	NAM-1008
Milling machine	
Receptacles	NAM-1102
Receptacles	NAM-1107
Units, dental	NAM-1108
Refrigerating coils	NAM-1111
Pumps, centrifugal	NAM-1112
Forgings	NAM-1301
Units, air conditioning Units, air conditioning	NAM-1302 NAM-1303
Fuses	NAM-1307
Arc welding sets	NAM-1308
Turbo-generators	NAM-1309
Ambulances	NAM-1311
Cutters	NAM-1313
Cable	NAC-12601
Coils	NAC-12605
Structural steel racks	NAC-12608
Convertible angle cots	NAC-12702
Coil winding machines' spare	parts NAC-12706
Sweep wire	NAC-12709
Air ejector units	NAC-12710
Bendix brake parts Electric instrument sterilizers	NAC-12711 NAC-12712
Anchors	NAC-12712
Mercury	NAC-12806
Pressed metal urinals	
Studs and nuts	NAC-12906
Pump rotors	NAC-12907
Prosthetic pliers	NAC-12908
in a serie pileto	
Centrifugal pumps	NAC-12910
Centrifugal pumps Pressure proof bridge repeator	NAC-12910
Centrifugal pumps Pressure proof bridge repeator and spare parts	NAC-12910
Centrifugal pumps Pressure proof bridge repeator and spare parts Gasoline tractors	NAC-12910 S NAC-12911 NAC-12912
Centrifugal pumps Pressure proof bridge repeator and spare parts Gasoline tractors Downhaul chain	NAC-12910 rs NAC-12911 NAC-12912 NAC-13005
Centrifugal pumps Pressure proof bridge repeator and spare parts Gasoline tractors Downhaul chain Steam generating plant	NAC-12910 NAC-12911 NAC-12912 NAC-13005 NAC-13007
Centrifugal pumps Pressure proof bridge repeator and spare parts Gasoline tractors Downhaul chain Steam generating plant Buttons, gilt	NAC-12910 NAC-12911 NAC-12912 NAC-13005 NAC-13007 NAC-13008
Centrifugal pumps Pressure proof bridge repeator and spare parts Gasoline tractors Downhaul chain Steam generating plant	NAC-12910 NAC-12911 NAC-12912 NAC-13005 NAC-13007 NAC-13008 NAC-13011

William B. Pollock Co. Embarks on Expansion

Youngstown

• • • Work has started on a \$400,-000 expansion program for William B. Pollock Co., fabricators of blast furnace and steel plant equipment. The plant is being jointly financed by the Pollock Co. and the Defense Plant Corp.

WPB Scans Schedules

Pittsburgh

• • • For the past few weeks, WPB investigators have been at Pittsburgh and other steel centers making a study of steel mill schedules and production records in order to check on the priority status of steel shipments. It is believed the results of these studies will eventually wind up as a report.



Ohio War Plant's Big Bonuses Cited

• • • Testimony before a House investigating committee in Washington early this week indicated that Jack & Heintz, Inc., Cleveland aircraft parts firm capitalized at \$100,000, held \$58,000,000 of Army and Navy contracts, and paid \$145,000 to William S. Jack, president, last year and \$39,000 to Mrs. Adeline Bowman, his secretary.

E. M. Toland, general counsel of the Naval Affairs Investigating Committee, asserted that on three occasions the company refused to reduce its unit price for plane starter motors from the \$600 quoted on the initial contract. The cost of making the starters was \$272, according to a company controller, although Mr. Jack said no one knew the exact cost.

Allis-Chalmers Will Hire 2000 Women

Milwaukee

• • • The prospective hiring of some 2000 women by Allis-Chal-mers Mfg. Co. will be the most extensive step of the kind this city has seen. During the World War women clad in khaki coveralls were a common sight on street cars and buses but to date relatively few are engaged in actual factory production work. Rapid expansion of manufacturing facilities and repeated draft calls have depleted the ranks of available men.

HoLet-Up to Cutting

SHELL STOCK

 "Buffalo" Billet Shears are powerful production tools, built to operate on a gruelling 24-hour-a-day schedule. Many are now in use cutting forging stock of every size and descriptionan important Buffalo contribution to the National wartime program.

"Buffalo" Billet Shears have electrically welded frames, built of "Armor-Plate" steel. These rugged "giants" are easy to control, economical to operate - unrivalled tools for today's relentless production

BUFFALO FORGE COMPANY

492 Broadway

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



BILLET SHEARS

Molybdenum Allocations Delayed Until May I

Washington

• • • Because of lack of time, a complete allocation system for molybdenum will not be placed in effect in April as was provided in general preference order M-110. In advising consumers on Tuesday of delay in effectuating the order, WPB's Division of Industry Operations said that requests for delivery of molybdenum must be received by WPB by the twentieth of the preceding month and that complete working of the order will take effect May 1.

For the remainder of March and April, it was stated, the following general rules should be observed:

general rules should be observed:
No order should be placed or accepted which will increase the customer's minimum working inventory.
Shipments during March or April should not exceed shipments made to the same customer during either January or February, whichever was the greatest. If such an amount already has been shipped for March no further shipments should be made for the month.
No deliveries of molybdenum should be made before May 1, except on ratings of A-10 or higher.

Bearing Data Handbook

• • • Engineering data on the design, composition and installation of plain bearings is presented in the 1942 edition of the "Engineers Handbook" published by the Lumen Bearing Co., Buffalo. Well illustrated with cross-section drawings and with photomicrographs of the company's non-ferrous alloys for bearings and other industrial applications, it also contains data on the composition and physical properties of these alloys.

Freight Boost Intensifies Price Ceiling Difficulties

• • • • The enforcement of higher freight rates last week on pig iron, scrap, finished steel and other items brought very little complaint from consumers, who are forced to undertake the absorption. Due to the large volume of war production, the burden of the increase falls upon the government itself.

Strictly speaking, the increased freight cost on shipments representing dislocated tonnage because of the war effort is being paid by the consumer, but steel companies are absorbing that portion of the recent freight rate advance in direct proportion to the amount of transportation costs absorbed when the normal or governing basing point price setup is used.

Arbitrary switching charges at steel basing point centers have not been changed and no application has been made to change them but steel companies will absorb the increases resulting from the freight rate advance. OPA, however, has been asked by some companies to grant relief on some arbitrary basing point steel prices at such centers as Detroit, Upper Michigan, Toledo, and Gulf Ports. Petitioners are asking that these basing point prices which are built up on freight rates plus competitive situations be revised upward to the extent of the freight rate increase.

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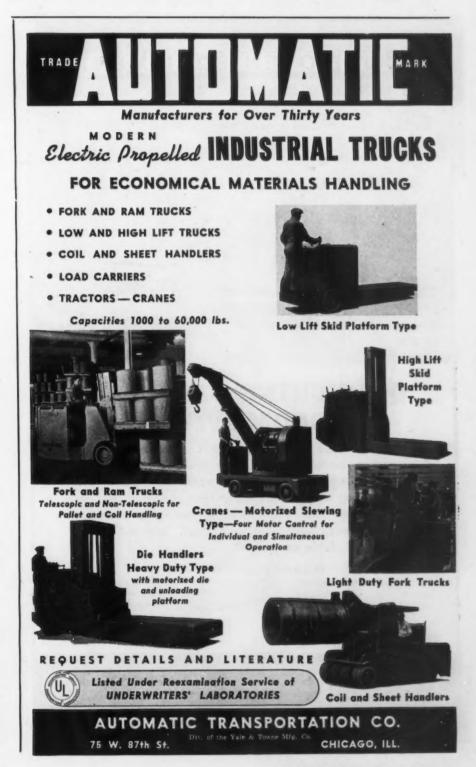
The effect of the freight rate increase upon delivered prices in the Far West is examined in this issue in the "West Coast" column starting on page 84.

Steel warehouses are obliged to absorb the 6 per cent surcharge on metropolitan deliveries. With prices frozen by OPA, the jobbers have no alternative under the present price schedule (No. 49). On country shipments from warehouses, the consumer is absorbing the extra freight, due to equalization provisions of the price schedule.

In the East last week it was reported the steel warehouse price order is being rewritten. Elsewhere it was rumored that a "standardized" price setup might be adopted which would remove existing geographical differentials.

OPA declined to confirm the latter rumor, however.

There is some agitation in warehouse circles for a standardization of warehouse prices within a given center which is a direct outgrowth of different price levels before the freezing order went into effect. Some warehouse interests who had been charging less than the steel warehouse prices on the basis of volume, found their prices frozen at that level. With volume having fallen off in some cases to 50 per cent of the allowable quota, movements are on foot to bring the lower prices up to the so-called steel warehouse prices. OPA,



however, in the warehouse order left the door open for such individual cases of relief providing comprehensive sales data and costs were supplied in order to render a decision.

Ore Price Schedule Soon

• • • Formal announcement has been made by OPA concerning

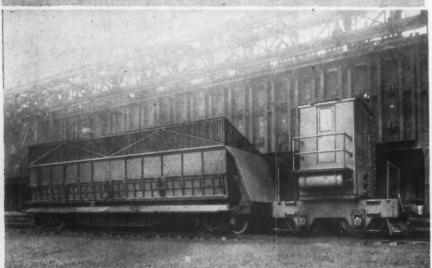
negotiations with Lake iron ore producers to establish a price ceiling on 1942 shipments. Pending issuance of a schedule OPA has suggested that "in those few cases where it might be necessary to do so," shipments on new contracts be invoiced either at an open price or at a negotiated price not to exceed \$4.45 per gross ton for Mesabi non-Bessemer base ore delivered at lower lake ports and at customarily related prices on other

grades. The schedule is expected to be issued soon. The meeting is Friday. OPA's announcement was forecast in this magazine last week.

At a meeting last week between representatives of Lake ore producers and Lake carriers it is reported that discussion was given to a suggested increase in the port-to-port rate of 77c. per gross ton. Agreement is said to have been reached at OPA request that the rate will not be increased for the present but would be continued at least through the second quarter. It was said that a change in the handling charge of 14c. a ton is not contemplated.

"These prices, of course," said the OPA statement, "would apply only to shipments actually made from the mines before the forthcoming maximum price schedule becomes effective. Thereafter prices must be within the limits established by the schedule."

COKE OVEN EQUIPMENT



QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

Other ATLAS Products

Ore Transfer Cars

Scale Charging Cars

Electrically Operated Cars for Every Haulage Purpose Locomotives for Switching and Interplant Haulage

Turntables

Reports Still Required

• • • • The fact that affirmations of compliance are no longer required by OPA in a wide range of price schedules does not mean there has been any relaxation of requirements for record-keeping and monthly sales reports, according to Walter Gelhorn, regional attorney at New York for OPA.

A list of principal report forms in connection with OPA price schedules appears on page 122.

1

Power Is Limited

• • • OPA authority to institute or appear in civil actions or proceedings on behalf of the price administrator is limited to the general counsel of OPA or his specified associates or authorized OPA attorneys.

1 1

Byproduct Stabilization

• • • Producers and sales agents of benzol, toluol, xylol and solvent naphtha obtained from by-product coke ovens were asked by telegram, March 14, to continue through the second quarter of

The ATLAS CAR & MFG. CO.

ENGINEERS

MANUFACTURERS

1100 IVANHOE RD.

CLEVELAND, OHIO, U. S. A

1942 prices prevailing during the first quarter. In effect this telegram is a request that the following prices be maintained as maximum prices per gallon for tank car quantities:

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Indust. pure benzol	0.15
Nitration benzol	0.15
Indust. 90% benzol	0.15
Thiophene free benzol	0.175
Dewaxing 90% indust. benzol	0.15
Indust. 2-deg. toluol	0.28
Nitration 1-deg. toluol	0.295
Industrial xylol	0.27
Ten-degree xylol	0.30
Five-degree xylol	0.37
Nitration xylol	0.42
Solvent naphtha	0.27



• • • Dealers in prime virgin mercury may split the 2 per cent premium allowed them under Price Schedule 93 with another dealer or with a broker, but may not split the premium with a producer if this would result in the producer obtaining more than the applicable maximum price, OPA ruled March 19. A consumer who employs a broker or agent to purchase prime virgin mercury may pay 1 per cent commission if the mercury is bought from a producer. Several other portions of the schedule were clarified also.

Plans for Bituminous Prices

• • • The bituminous coal division of the Department of the Interior and the OPA have formulated a plan of cooperation to prevent inflationary price rises. The division will make recommendations preliminary to action under the powers vested in OPA.



Aid on Pigments Given

••• • American Zirconium Corp., Baltimore is permitted until May 2 to sell titanium pigments for 1½c. per pound above the official ceiling price.



Electric Wire and Cable

• • • Under Amendment No. 1, issued March 18 to Price Schedule 82, exemption is given on prices of products sold under developmental contracts with the U. S. Government, manufacturers' reporting requirements are simplified, and

control is tightened over prices of new and specially designed products.

Each manufacturer is required to file with OPA his price estimating procedures in use Oct. 15, 1941. Sales made thereafter in compliance with the procedure need not be reported.

To meet the gradual evolution of new products from the special-

ly-designed to standard class, three steps are provided. First, specific approval of OPA of individual prices of new or other special products is required. Second, OPA approval is necessary when new standard estimating procedure is felt necessary. Third, OPA approval is needed on new price sheets when the product finally becomes standard.



Price Ceilings Set on Household Appliances

• • • In a broad step Monday of this week, OPA set maximum retail prices for seven major household appliances and for new typewriters. Affected by the order, which becomes effective next Monday, are vacuum cleaners and attachments, heating and cooking stoves and ranges, washing and ironing machines, radio sets, phonographs, new mechanical refrigerators.

Vacuum cleaners and mechanical refrigerators are placed under permanent ceilings, with price margins of wholesale distributers frozen at levels of last Oct. 1-15. The other items are under temporary regulation in force for 60 days, with prices pegged at levels of last Thursday, March 19. In the case of

typewriters, the ceiling price date is March 5.

Until now OPA has regulated at retail only the prices of autos, tires and gasoline, and the latter in only 19 states.

1 1

Aluminum Scrap Prices

• • • Proper maximum prices for several grades of segregated solid aluminum alloy scrap not presently covered by Price Schedule No. 2 were suggested March 23 by Acting Price Administrator John E. Hamm.

Price Schedule No. 2 (Aluminum Scrap and Secondary Aluminum Ingot) fixes maximum prices for what is known as segregated 2S solid scrap. Although segregated solid aluminum scrap other than 2S was formerly under this Schedule, the ceiling on such scrap was removed on Jan. 13, 1942, in view of Priority Order M-1-d.

Following are the prices suggested for carload quantities of segregated solid aluminum alloy scrap other than 2S, f.o.b. point of shipment:

Loose scrap, too heavy to briquette. 12c.
Briquetted or tightly baled scrap. 12c.
Loose baled or packed scrap suitable for briquetting 11½c.
Loose scrap, suitable for briquetting. 11c.

It was pointed out that differentials below these maximum prices may be paid for such scrap in smaller quantities or for scrap not thoroughly prepared.



Antimony in Bulk Up

•••• All producers and producers' agents of antimony metal have been requested not to make sales at more than $14\frac{1}{2}$ cents per pound for bulk carload lots, f.o.b., Laredo, Tex., of the standard grade. For several years, the market price for this standard grade—99.0 to 99.8 per cent pure antimony—has been 13 cents per pound, f.o.b., Laredo.

The OPA also requested the industry not to exceed the following prices on other grades: 15 cents per pound for 99.8 per cent antimony metal and above (maximum arsenic impurity to be no more than .05 per cent and no other single impur-

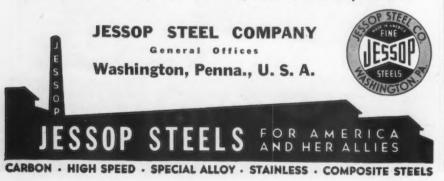


- Outstanding production records for Jessop CNS include an average of 125,000 pieces on dies forming conduit boxes from 14-15 gauge hot rolled sheets. Previous use of regular oil hardened steel resulted in an average of only 50,000 pieces.
- The balanced analysis of CNS gives it maximum hardness with good toughness. Resistance to corrosion is another inherent characteristic. It can be oil hardened or air hardened, as desired. Check the list below of typical CNS applications. No doubt, you too will find CNS the answer to many of your tool and die problems where long production runs are required.

TYPICAL APPLICATIONS OF CNS DIE STEEL

Dies for coining, crimping, cutting, drawing, extruding, forming, hobbing, punching, slotting, stamping, thread-rolling, trimming and general blanking work; Adjustable Reamer Blades; Broaches; Burnishing Tools; Bushings; Cutters; Drill Plugs; Hobs; Plug and Ring Gauges; Punches; Reamers and Sand-Blast Nozzles; Edging, Spindle and Guide Tools; Spinning Tools; Forming and Seaming Tools; Swedges; Taps; and Brass-turning Tools.

• There is a JESSOP steel for every tool and die requirement.



ity to be in excess of .1 per cent), and $14\frac{1}{2}$ cents per pound for antimony metal grading under 99.0 per cent. An additional charge of $\frac{1}{4}$ cent per pound may be made for any of the named grades, when packed in cases or boxes.

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For antimony metal, which is sold in less than carload lots, the price per pound delivered to the consumer in less than carload lots has been established as the applicable carload price, plus carload freight per pound to the distributing point, plus an additional charge as indicated below:

Additional charge per lb. which may be made by producers or producers' agents 10,000 lbs. to less than a carload. ½c. 9999 lbs. down to 224 lbs. ½c. 223 lbs. and less 2c.

WPB Warns on Placing Duplicate Iron Orders

• • • Approximately 900 foundries are reported to have been warned against ordering "greater quantities of pig iron than required to meet your monthly production," by a recent letter sent them by the Compliance Section of the War Production Board. The letter pointed out that this was a violation of the third clause of the affidavit on form PD-69, and that unless it was discontinued immediately, punitive action would be taken.

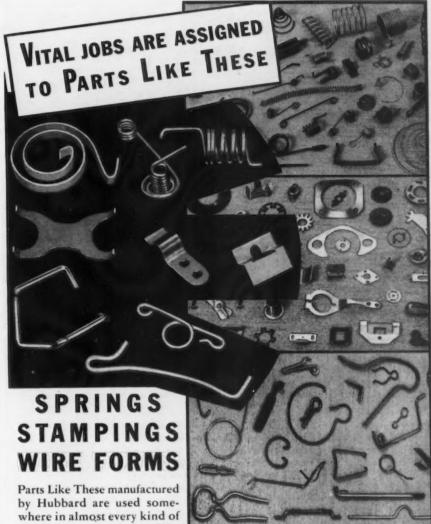
It is reported to THE IRON AGE that the basis for the letters was evidently a comparison in Washington of the pig iron required by certain foundries in November, 1941, as against their requests for allocations for February, 1942. However, there is some doubt that this was a good basis for accusing foundries of violations in view of the fact that in one instance a foundry had received recent large orders for machine tool beds which required larger amounts of pig iron than had previously been consumed.

On the other hand, it is reported that many foundries had placed similar orders for their monthly requirements with as many as three or four different pig iron producers. The purpose of this is believed to be a desire to be placed upon the order books of various suppliers with the thought that difficulties in securing pig iron might be minimized by this action.

Wheeling, SWOC Sign War Output Agreement

Pittsburgh

• • • • The SWOC and Wheeling Steel Corp. have signed a "memorandum of understanding" setting up production drive committees in line with Donald Nelson's recent request. The agreement stipulates that a top production drive committee operates at the Wheeling Steel's general office which will supervise and direct similar committees in 72 separate departments of 10 plants of Wheeling Steel. Actual mechanism of the committees called for creation of one committee consisting of one union member and one management representative in each department of each plant. Over each of the 10 plants will be another committee made up of one union and one management representative.



Parts Like These manufactured by Hubbard are used somewhere in almost every kind of product or mechanism and the usefulness of the product, or the proper functioning of the mechanism, often of vital importance, are dependent upon them.

They are manufactured by Hubbard from steel, brass, bronze and other material . . . formed, shaped, heat treated, tested and assembled with modern equipment and scientific instruments.

Your request for information on Parts Like These and their use and application in your products will be carefully analyzed; suggestions and recommendations will be returned to you.



M-D-HUBBARD SPRING CO.

331 CENTRAL AVE. . PONTIAC, MICH.

Priority System Change Puts Emphasis on End Uses

Washington

• • • • A basic change in the priorities system, by which ratings will be determined primarily by the end use of products, has been announced by WPB. This change will be effectuated by placing all war industries under the Production Requirements Plan (order P-90) instead of under individual industry blanket priority orders as at present.

When More Speed Means More Guns
KENNAMETAL TOOLS
DO 8 HOURS WORK IN 90 MINUTES

Operation: Facing and Boring Hub. Gun Mount Part
Material: Bough Steel Casting, 8 dia. with protruding lug
Speed: 250 S.F.M.

★ The tool set-up above shows how KENNAMETAL tools are giving one manufacturer an 80% time saving in machining parts for gun mounts. Previously, the facing operation was accomplished by use of a special alloy high speed tool bit protruding 3", doing the interrupted facing cut.

In the KENNAMETAL set-up the compound rest was swung 90° for rigidity and a standard 20T150 KENNAMETAL planer tool, held as shown to cut to a square shoulder, was used for facing. Previously, the tools had always headed into the cut and the carriage had to be backed off, but KENNAMETAL TOOLS did the work so smoothly that only one cut was required, instead of two. Roughness of casting and interrupted cut made the negative rake angles of the style 20 tool preferable to the standard facing tool style 12. A KENNAMETAL 21T150 tool with a 21/2" overhang was used for boring, and a KENNAMETAL 9T80 tool turned the outside diameter. This set-up, and the KENNAMETAL tools employed, permitted completion of each job in 90 minutes, a saving of 61/2 hours per job.

KENNAMETAL is proving itself by similar performance in armament plants throughout the country... machining steel of all hardnesses up to 550 Brinell at economical high speeds, with minimum tool wear and longer life between regrinds. Write for free copy of the new vest pocket manual for KENNAMETAL users.



Canadian Agent: KENNAMETAL TOOLS & MFG. CO., LTD., Hamilton, Ont.



STYLE NO. 21



STYLE NO. 20



STYLE NO. 9



A specific requirements approach to the control and distribution of scarce materials will replace the use of general or blanket priority rating orders as rapidly as the necessary new orders and procedures can be put into effect. Between April 1 and June 30, most of the blanket rating orders will be revoked or allowed to expire, and companies which have been operating under blanket ratings will be required to apply for priority assistance under the Production Requirements Plan.

The rapidly increasing material requirements of the war program make it impractical to continue the use of preference ratings which have been assigned under existing "P" orders to whole industries. WPB explained, without any exact check of the amount of material which such ratings may be used to obtain. Through the Production Requirements Plan, the Director of Industry Operations will continue to assign ratings to deliveries of materials for essential uses, but the rating assigned in each case may be used to obtain only a specified quantity of materials or products.

Under the Production Requirements Plan, a company makes a single application for priority assistance covering all of its estimated materials needs over a three-month period. The applicant must submit full information as to his inventories, the end use of his products, etc. Priority ratings are assigned on the basis of such applications to permit producers of products essential to the war effort or minimum civilian needs to obtain specified quantities of materials during a quarter. Interim applications may be filed when a company needs additional quantities of material during the quarter because of increased war or other essential business.

A Modified Production Requirements Plan has been developed to meet the needs of small firms whose business is less than \$100,000 a year. Such companies may use a simplified application form, PD-25X.

Because it would be physically impossible to handle the load of PRP applications if they were to be submitted immediately from all companies in all industries, the changeover from the use of blanket ratings will be continuous over a period of three months, and

116-THE IRON AGE, March 26, 1942

WPB to Survey Copper And Pig Iron Use

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• • • A survey of pig iron distribution, as well as additional investigations of operations of copper scrap dealers and foundries, will be launched shortly, the Compliance Branch of WPB's Division of Industry operations has announced. These surveys follow a similar investigation, recently completed, of 90 prima-

ry processors of refined copper.
The reports of the Federal
Trade Commission's examiners who conducted the investigation of the activities of primary processors of refined copper have been filed with the Compliance Branch, where they are being reviewed and analyzed, and where appropriate enforce-ment action will originate in cases of violation of priority procedure.

Investigation of the copper industry will be continued by some 800 inspectors of the Wage and Hour Division of the Department of Labor, acting as agents of the WPB, who will check into the operations of 4000 scrap dealers and 2500 foundries to determine their inventories and their degree of compliance with the copper conservation order and other priority and allocation regulations.

The Interior Department will lend the WPB 200 investigators from the Geological Survey, the

from the WPB 200 investigators from the Geological Survey, the General Land Office and the National Park Service, to conduct the survey to be undertaken shortly of 3200 foundries, including malleable iron and steel foundries, which was night iron. foundries, which use pig iron in their operations. The purpose of this investigation is also to determine inventory conditions, and the degree of compliance with priority orders and procedures.

Hector J. Dowd is chief of the Investigation Section of the Compliance Branch and all ac-tivities of the WPB in this field are under his direction.

each industry will be notified as to the date by which the change must be completed.

End Use Code Developed

Washington

• • • As the Bureau of Fisheries tags fishes to trace their spawning, traveling and other habits, WPB is going to tag materials and manufactured products to trace their end use. For this purpose there has been devised a system which is at once a statistical method for picturing the flow of commerce, and a more accurate statistical report on the amounts of rated materials and products used by American industry, called the End Use Code. The WPB tags are the end use code symbols which have been assigned to 16 principal classes of uses.

The classes are: Military; pro-

duction and processing of raw materials: construction of new buildings and maintenance of existing buildings, industrial machinery, transportation, communication; public health and safety; agricultural equipment and supplies; food preparation; textiles and wearing apparel; education, recreation and amusement; domestic equipment and supplies; office equipment and supplies; small



SAYS USER: "I can truthfully say that it is the finest oven of its type that we have ever seen or used. As you know, the feature of first importance to us in an oven is uniformity. With your oven we get what I would call perfect uniformity of color in normalizing all kinds of springs made of all kinds of wire in sizes from .008" to .125", regardless of the weight of the load. Our oven loads vary from 800 lbs. down to as little as 1 lb., the latter consisting of as many as 20,000 tiny springs."—Atlas Spring Co., Chicago

This is the kind of performance you can count on when you install Maehler Recir-culating Air Heat Ovens—gas or oil fired or electrically heated-for aging, stress relieving, normalizing, tempering, bluing, annealing, etc. Write today outlining your requirements.

NEW BULLETIN:

Shows typical installations of MAEHLER HEAT TREATING OVENS - gives users' reports. Write for your copy today. Also ask for CORE OVEN case studies.

THE PAUL MAEHLER CO. 2212 W. Lake St., Chicago, Illinois

INDUSTRIAL OVENS

FOR HEAT TREATING . . . CORE BAKING . . . JAPANNING . . . ENAMELING, ETC.

tools and hardware sold at retail; all other.



Jobbers Get Priority Aid

HERE'S A

HANDBOOK

YOU NEED!

up-to-date manual o thods of metal cleanin dicable to today's need

• • • Wholesalers, distributers and jobbers of a variety of essential civilian and war supplies will be given priority assistance in maintaining maximum permissible inventories by Limitation Order L-63, soon to be issued, WPB has

announced. The order requires that applications be made on a new form, PD-1X, and supersedes order M-67.

The following supplies are affected by the order: Automotive; aviation; builders; construction; electrical; foundry; hardware; health; industrial; plumbing and heating; railroad; refrigeration; restaurant; transmission; textile mill; and welding and cutting supplies.

Distributers who use form PD-1X will be required to furnish information on their sales and inventory of the types of material for which priority assistance is requested. Ratings will be assigned on the basis of the importance of the product, the use to be made of it by the distributers' customers, and the availability of the materials required.



Molybdenum Restricted

• • • Molybdenum cannot be delivered or reduced from ores without the permission of the WPB director of industry operations except in small quantities, according to general preference rating order P-110. Consumers requiring less than 50 lb. per month for use in the manufacture of non-metallic products are not required to file applications and other reports called for in the order.



Palm Oil Use Limited

• • • Unless other uses are specifically authorized by WPB's director of industry operations, palm oil can be consumed after April 1 only in the manufacture of steel and glycerine. It also is required that 20 per cent of inventories of more than 30,000 lb. held one day prior to the date of the order be held subject to the direction of WPB.

This control over palm oil is designed to conserve the supply and was provided for by order M-59, issued Friday.

The permissible uses are:

(1) The manufacture of tin plate, terne plate, long terne plate, steel sheets, steel strip and black plate.

(2) Any manufacturing process in which glycerine is produced where the amount of glycerine remaining in the product does not exceed 1.5 per cent.



Office Equipment

• • • Durable office equipment may not be ordered with preference ratings assigned under the maintenance and repairs order, P-100, according to an interpretation of the order issued on Monday by

FASTER, Better Cleaning at less than ¼ the Cost of Solvent Degreasing

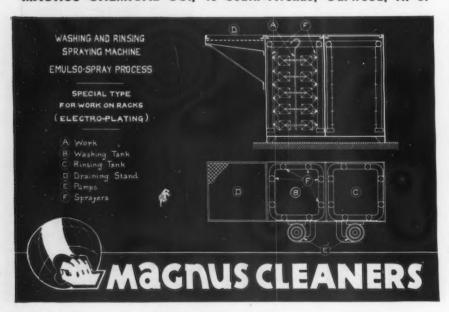
Even if supplies of degreasing solvents were plentiful, there's a faster, better way of cleaning metals in war time. It's a method that cleans more thoroughly and is more dependable, particularly on mixed dirts. It involves no noxious or toxic vapors. And the materials used are freely available.

MAGNUS EMULSO - DIP and EMULSO - SPRAY

are two variations of the same cleaning method, applicable to both hand operated and fully automatic cleaning equipment. Either process is applicable to any metal and any dirt, particularly smut. Experience of users during the past year indicates that the cost of cleaning by this method is well under 1/4 the cost of solvent degreasing.

It will pay you to investigate NOW. The method is often adaptable to existing washing machines, but if not, we will design Magnus Emulso-Dip or Emulso-Spray washing machines to meet your particular cleaning operations.

MAGNUS CHEMICAL CO., 46 South Avenue, Garwood, N. J.



WPB. The interpretation specifically excludes typewriters, adding machines and other business machines, desks, filing cabinets and similar items of durable office equipment from the definition of operating supplies for which the A-10 rating assigned by the order may be applied.

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Priorities Regulation No. 8, issued last week, eliminates the necessity of filing certain PD forms. These forms are listed on page 19 of the Priorities Guide, published as Section Two of this issue.

tional Parts Corp., Chicago, delivered for processing 68,143 lb. of aluminum scrap to the Atlas Brass and Aluminum Foundry, also of Chicago. The Atlas foundry accepted this scrap, to which no preference rating had been assigned, and later delivered to the National Parts Corp., finished automobile radiator grills containing 35,550 lb. of aluminum.

The suspension orders provide

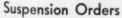
that for a period of two months from the date of issuance, neither company may accept, deliver or process any primary or secondary aluminum, aluminum scrap, aluminum products, or alloys of which aluminum is a major part. They are also prohibited from accepting purchase orders, or entering into contracts for delivery of any type of aluminum or aluminum products. The orders also enjoin all persons

Plumbing and Heating

has been given by WPB to installers and suppliers of plumbing and heating equipment to obtain materials needed for emergency repairs. The rating may not be applied to get copper already fabricated in sheets, wires, rods, or tubes or to any scarce materials which can be eliminated by change of design or by substitution, according to preference rating order P-84.



Conversion Reports • • • Industry has been ordered by WPB to make a month-by-month report on its conversion to war work. In a recent letter to manufacturers WPB enclosed the first three-page form to be filled out and returned for tabulation by March 25. Similar forms will be returned by manufacturers each month. Plants will list principal classes of products produced during the previous month. The report will give the schedule for peak operations on war work including the expected month of peak employment and the value of war work shipments, estimated total man hours and estimated total wage earners in the peak month.



• • • Suspension orders have been issued by WPB against two users of aluminum scrap who, by entering into an unauthorized toll agreement, are alleged to have violated conservation orders M-1-a and M-1-c. The records in the case, according to WPB, show that the Na-



from delivering aluminum to the two companies during the period covered.

* 1

Aluminum, Magnesium

• • • Producers and basic fabricators of aluminum and magnesium have been granted the use of a preference rating of A-1-j on their orders for repair, maintenance and operating supplies by

preference rating order P-120, issued by WPB. The order is applicable only when specifically assigned to an individual company with a serial number which must be used in all applications of the rating.

In addition to the A-1-j rating for normal use, any company to which a copy of the order is issued may use an A-1-a rating on orders for materials required in the event of an actual breakdown or similar emergency, and an A-1-c rating on orders for materials required to avert a breakdown or when there is a threatened failure to meet basic production schedules.

1 1

Washing Machines

• • • WPB has announced that it will halt production on domestic washing machines on April 15 in the case of large volume manufacturers, and on May 15, in the case of companies having small producing capacity. Stockpile building is contemplated as both larger and smaller companies will be ordered to produce 150 per cent of their February quota in the period before production stops. The proposed order does not apply to replacement parts. No priority rating will be given to finish quotas, but hardship cases may get some consideration.

1 1

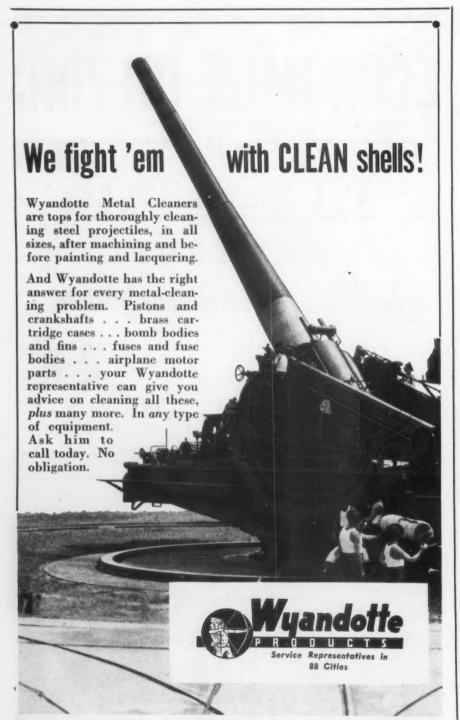
White Metal Roundup

• • • A roundup of all white metal frozen in the hands of costume jewelers by the terms of amendment No. 1 to conservation order M-43-a has been inaugurated by the Inventory and Requisitioning Branch of the Bureau of Industry Operations. It is expected that from 1,000,000 to 1,500,000 pounds will be recovered for war uses.

Manufacturing jewelers have been notified to report immediately their inventories of white metal, tin and other tin-bearing metals. Recipients of the letter must also indicate, when filing the reports, whether they are willing to sell at the prices offered in the schedule worked out by the Inventory and Requisitioning Branch.

In cases of refusal to accept these prices voluntarily, the War Production Board will probably have to requisition the material, leaving the question of compensation to be determined in accordance with procedures established under the requisitioning statutes.

The National Lead Company, acting as agent for the Metals Reserve Corporation, will handle the actual purchase of the white metal, and will advise sellers on WPB shipping and trucking directions, and weighing and sampling procedures. Following inspection and verification of weight, grade and analysis, payment will be made by the National Lead Company.



THE J. B. FORD SALES COMPANY, WYANDOTTE, MICHIGAN

This Week's Priorities and Prices

Priority system change announced; industry to use Production Requirements Plan as present blanket orders expire. Transition to be gradual over next three months. (WPB-615)

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- OPA orders backed by court, in Omaha ruling that whenever litigation is affected by a rationing order, the rationing order will control in the determination of the case. (OPA-PM2745)
- Spruce lumber used in aircraft placed under maximum price ceiling in regulation No. 109, effective April 1. (OPA-PM2737)
- Oil shippers to meet with OPA to discuss effects of recent freight rate advance. (OPA-PM2742)
- Laundry and dry cleaning machinery industry advisory committee formed. (WPB-623)
- Scrap and reclaimed rubber placed under stricter control in amendment No. 6 to order M-15-b. (WPB-625)
- Metal house furniture production banned after May 31 in order L-62. (WPB-626)
- Shellac use in civilian industries to be curbed by order to be issued shortly. (WPB-627)
- Sulphite pulp order M-52 extended to May 1. (WPB-630)
- Machine tools owned by NYA discussed in statements by Nelson and Hillman. (WPB-631 and 633)
- Freight car builders asked to standardize and pool designs to expedite car building program. (WPB-603)
- Tires and tubes to be made available for heavy off-thehighway vehicles used to transport materials on mining, construction, logging and petroleum development projects. (WPB-604)
- Farm scrap collection to be aided by WPA. (WPB-606)
- Valve industry advisory committee expanded to include low pressure valve makers. (WPB-607)
- Tung oil sale restrictions removed by amendment No. 2 to order M-67, effective March 19. (WPB-608)
- Lauric acid oil use curbed by order M-60; order includes palm kernal, cocoanut and babassu oil. (WPB-610). Palm oil use further restricted by order M-59. (WPB-612)
- Aluminum and magnesium producers and fabricators assigned rating of A-1-j for repairs, maintenance and operation supplies in order P-120 issued March 20. (WPB-611)
- Lead allocation order M-38 extended to Dec. 31. (WPB-613)
- Metal and wire lathe industry advisory committee formed. (WPB-614)
- Iron and steel use in beds, bed springs, and mattresses restricted by order L-49 effective March 20. (WPB-616)
- Investigations into priority operations in pig iron and copper scrap dealers and foundries launched by WPB. (WPB-617)
- White metal frozen in jewelers' hands by order M-43-a to be rounded up by WPB's requisitioning branch. (WPB-624)

- Lead and tin product makers discuss price ceilings with OPA. (OPA-PM2722)
- Gasoline prices frozen in specified coastal areas. (OPA-PM2727)
- Wastepaper price schedule No. 30 revised to encourage better sorting. (OPA-PM2728)
- Benzol, toluol, xylol and solvent naphtha producers requested to hold present prices through the second quarter. (OPA-PM2729)
- Mercury dealers may split 2 per cent premium with other dealers or brokers, according to revision of price schedule No. 93. (OPAz2731)
- Makers of shoe, leather working and tanning machinery prohibited from accepting any order except that bearing rating of A-9 or higher. (WPB-591)
- Brush industry advisory committee formed. (WPB-593)
- Distributors, jobbers and wholesalers aided by simplified priority application, PD-1-x, designed for their special use. (WPB-594)
- Cast iron soil pipe industry advisory committee formed. (WPB-597)
- Fire sprinkler industry advisory committee formed. (WPB-601)
- Metal lathe and accessory makers discuss with WPB possibilities of curtailing use of sheet steel. (WPB-605)
- Tire price increase announced Jan. 1 rescinded by four major rubber companies. (OPA-PM2719)
- Electric wire and cable price schedule No. 82 revised to encourage greater production. (OPA-PM2721)
- Typewriter production limited to most essential needs by order L-54-a, issued March 18. (WPB-571)
- Tin restrictions apply to Army, Navy and certain other Governmental agencies, according to amendment to order M-43-a. (WPB-577)
- Auto license plates made of metal curtailed by order L-32. (WPB-579)
- Cellophane order L-20 extended indefinitely. (WPB-585)
- Molybdenum allocation established by order M-110, effective March 18. (WPB-589)
- Stel mills may pay new 6 per cent transportation surcharge on scrap iron and steel scrap, according to revision to price schedule No. 4. (OPA-PM2717)
- Priorities Regulation No. 8 issued March 17 reduces number of PD forms which must be filed. See The Iron Age Priorities Guide, Section Two of this issue, for a list of these forms. (WPB-565)
- Plumbing fixture fittings and trim simplification ordered by schedule 5 of limitation order L-42. (WPB-641)

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB:600 means announcement 600 issued by the War Production Board.)

Principal Price Forms for Metalworking Industry

(Checklist of forms, related orders, and effective dates as established by OPA system of price controls. For details on price ceiling see THE IRON AGE Price Manual and weekly roundup of price control developments.)

NOTE—On March 13, OPA removed the provision requiring the filing of periodic "affirmations of compliance" from the last 35 OPA price schedules in which this requirement remained. The action, however, did not affect affirmations of compliance provided for in individual agreements with members of various industries, freeze letters, or other informal actions.

ORDEI No.	R	DATE ORDER BECAME EFFECTIVE	FORM No.	SUBJECT OF REPORT
	Second hand machine tools		100:1 102:2	Inventory or additions; sales or other dispositions. Application for permission to sell secondary aluminum
			102:3	ingot at prices higher than maximum. Same, aluminum scrap.
3	Zinc scrap, secondary slab zinc	3-31-41	103:2	Application for permission to sell zinc scrap at prices higher than maximum.
			103:3	Application for permission to sell secondary slab zinc at prices higher than maximum.
			103:5	Dealer application for permission to sell secondary slab zinc at prices higher than maximum.
4	Iron and steel scrap	4- 3-41	104:8	Monthly report of purchases, consumption and inventory of iron and steel scrap.
			104:15	Certificate for movement of scrap solely by motor vehi- cle. Signed by seller, buyer and delivery concern.
8	Pure nickel scrap, stainless, monel, etc	6- 2-41	108:5	Application for permission to sell imported nickel scrap at prices higher than maximum (notarized).
12	Brass mill scrap	7-22-41	112:1	Application for permission to sell brass mill scrap at prices higher than maximum.
			112:3	Buyers' report of purchase of imported scrap; filed within 5 days of purchase date.
20	Copper and copper alloy scrap	8-19-41	120:1	Application for permission to sell at higher than maximum prices.
				Permit for copper scrap buyers.
				Permit for copper scrap sellers.
			120:7	Consumer's monthly affidavit covering each delivery during preceding month (to be filed before the 10th of each month).
			120:8	Buyer's report of purchase of imported scrap; filed within 5 days of purchase date.
29	Coke; by-product foundry, blast furnace	10- 1-41	129:1 129:2	Application for exemption from the price schedule. Application for a maximum price by new producers and
				sellers.
36	Normal hytrl alcohol		136:1	Report of production (monthly—before 10th).
	Normal butyl alcohol		137:1 138:1	Report of production (monthly, before 10th).
38	Glycerine Steel castings		141:1	Inventory report to be made three times each year. Affirmation of compliance for producers (Notarized).
71	steel castings	11-19-41	141:4	Cost estimate sheet for castings on which no previous price was filed.
43	Used steel barrels and drums	12- 1-41	143:1 143:2	Report on higher than maximum prices for used drums Sellers' permit to deliver specified materials at price
			143:3	higher than maximums. Buyers' permit to accept specified materials at price
46	Palaying rail	10 0 41	146 - 1	higher than maximums. Report on higher than maximum prices for relaying rail
	Relaying rail	12- 2-11		Relaying rail sellers' permit to exceed schedule in spec fied instances.
			146:3	Relaying rail buyers' permit to exceed schedule in spec fled instances.
49	Resale of iron or steel products	12-15-41	149:1	Resellers' quarterly report on incoming shipments Pacific ports.
			149:2	Resellers' quarterly report on incoming shipments; Gu ports.
	Carried Target Control of the Contro			Resellers' report on prices.
64	Domestic cooking and heating stoves	1- 5-42	164:2	Statement of maker of private brand stoves sold or de livered for resale.
	4-1-1-1		164:3	Statement of purchaser of private brand stoves re price to ultimate consumer.
67	New machine tools	1-20-42	167:1	Report to be filed 30 days before delivery of machin with no list price Oct. 1, 1941, on which no sales we made Jan. 1-Oct. 1, 1941.
			167:2	
			167:3	Manufacturers' list of dealers.
83	Radio receivers and phonographs	2- 9-42	183:5	Maker's report describing substitution. (Due before 10th of May, July, Sept., Nov., Jan.)
			183:6	Reports on cabinet finish changes.
				Report on discontinued models.
105	Gears, pinions, sprockets, speed reducers	2-18-42		Monthly (before 10th) report on output,
	speed reduceds	2-10-12	205:1	sprocket or speed reducer sold during the preceding month, of which a sale was made during year ender Feb. 18. 1942. (Filed monthly before 10th, by manufacturers.)
			205:2	Detailed report for each "recurring special" geapinion, sprocket or speed reducer sold during the proceeding month, of which no sale was made during year ended Feb. 18, 1942. (Filed monthly before 10th manufacturers.)

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· E. A. Taylor, a veteran executive of the automobile industry, has been appointed works manager to coordinate wartime production in all Detroit plants of Hudson Motor Car Co. For the past 17 years Mr. Taylor has been in charge of all engine manufacture for General Motors Trucksfrom 1924 to 1929 in the Moline, Ill., plant of Yellow Truck and from 1929 to the present time in the Pontiac plant. Prior to 1924 he spent several years in other engineering and managerial capacities in the automotive field.

• R. W. Aiken has been named plant engineer of the Jessop Steel Co., Washington, Pa. He was previously chief engineer with Frazier-Simplex, Inc. Mr. Aiken's education at Pennsylvania State College was interrupted to serve in the army during World War I and afterwards he returned to complete the engineering course and receive his B.S. degree.

 S. R. Puffer, designing engineer of the supercharger department, General Electric Co., Schenectady, has been given the Coffin Award by the company for his "sustained, steadfast, and sound engineering direction." Others receiving this award are Waverly A. Reeves, who was cited for "his courage and resourcefulness in observing and overcoming critical difficulties in test flights," and Dr. C. W. Smith, technical supervisor of the supercharger department, who was honored for "his speedy and accurate solution of difficult technical problems by developing new test methods and correlating observations with theory." The awards are given annually to General Electric workers for unusual achievements by a foundation established by the late Charles A. Coffin, first president of the company. Winners receive money awards and certifi-

• Gwilyn A. Price, president, Peoples-Pittsburgh Trust Co., and Francis Crandall, vice-president, Melbank Corp., have been elected directors of Blaw-Knox Co., Pittsburgh, to fill vacancies on the board.



E. A. TAYLOR, wartime production coordinator of all Detroit plants of the Hudson Motor Car Co.

• Ralph C. Edgar, has been named manager of industrial relations for the Allegheny Ludlum Steel Corp., Pittsburgh. After four years as a newspaper reporter in Trenton, N. J., and Pittsburgh, he entered the employ of Westinghouse Electric & Mfg. Co. where



R. C. EDGAR, manager, industrial relations, Allegheny Ludlum Steel Corp., Pittsburgh.

he was a publicity representative and editor of the employees' publication.

• James H. Carmine has been elected vice-president in charge of merchandising of Philco Corp., Philadelphia. In 1923, Mr. Carmine became Pittsburgh representative for Philco and three years later, he was named manager of the Syracuse office, which handled Philco sales in most of New York State. After acting as manager of the company's East Central Division, with headquarters in Buffalo, and later in Cleveland, Mr. Carmine went to Chicago as sales manager of the Middle West in 1932. Three years ago he was transferred to the home offices in Philadelphia to become assistant general sales manager and in 1941 was made general sales manager.

• Harold P. Wade, well-known automotive engineer, has been named manager of Adel Precision Products Corp.'s new Detroit engineering office. Mr. Wade was formerly an executive engineer for the Packard Motor Car Co. and held a similar position with the Chrysler Corp.

• M. L. Sloan has been advanced from assistant manager to manager of the lamp department of the General Electric Co., Nela Park, Cleveland. Mr. Sloan's first job was with the old General Electric National Lamp Works in Cleveland where he was employed as commercial engineer. In 1912 he was transferred to the Youngstown (Ohio) Lamp Works where, in only a few months, he was advanced to the position of assistant manager. In 1913 he was transferred to the new Nela Park headquarters where he advanced steadily to become assistant manager of the lamp department in 1931.

• Fred P. Laudan, vice-president and general superintendent of Boeing Aircraft Co., has been named division manager of the company's new factory on Lake Washington in the State of Washington. With him an administrative staff of 11 main department heads has been transferred from the corresponding departments in the present organization. These include W. F. Flanley, administrative assistant; Carl Uhden, production manager; Carl Mahnken, chief inspector; Ed. E. Duff, divi-

sion engineer; Frank Weaver, personnel manager; G. H. Walker, plant engineer; F. M. Kingsbury, plant protection superintendent; Ralph Teig, chief accountant; F. M. Dobbins, purchasing agent; Charles Williams, tooling superintendent; J. W. Kingston, sub-assembly superintendent, and Harold Abling, fabrication superintendent.

- John Berry, Jr., has been elected assistant treasurer of the Bell Aircraft Corp., Buffalo, and Howard E. Hutton and Albert L. Wolf assistant secretaries.
- J. T. Elder and J. E. Wood have been added to the engineering staff of Bailey Meter Co., Cleveland, at Atlanta. Other additions include: J. E. Luppold to Seattle, E. P. Nye to Buffalo, R. B. Pogue to Milwaukee, W. D. Hilborn to Houston, J. J. Haslam to Kansas City, J. J. Wilber to Cleveland, C. E. Hicks to New York, J. R. Powell to Pittsburgh, S. G. Dukelow to Denver, R. V. Johnson to Chicago, W. D. Robinson to Boston, and C. C. Holtzman to Philadelphia.
- P. M. Murphy, former superintendent of the wire mill, Northwestern Steel & Wire Co., Sterling, Ill., has joined Republic Steel Corp. in the capacity of wire mill superintendent in the Chicago district. H. E. Roman, who was assistant wire mill superintendent, has been named superintendent of the wire mill of Northwestern Steel & Wire, and W. Al Blum has been promoted from general foreman of the wire drawing department to the position of assistant superintendent of the wire mill.
- S. G. Bates, first vice-president of the Hudson Motor Car Co. has been appointed general manager of the U.S. Naval Ordnance Plant at Centerline, Mich., which is being operated by the company under lease agreement with the Navy Department. H. M. Northrup, for many years chief engineer, has been elevated to a vice-presidency and placed in charge of that portion of the company's business which is being conducted in its Detroit automobile plants. M. H. Toncray, for many years in charge of the engineering department's body division, has been made chief engineer, and L. K. Rosenberg, formerly with the Yellow Truck & Coach Mfg. Co., has been named to assist Mr. Taylor.

- Alexander Skekel, formerly connected with Pittsburgh Steel Co., has been appointed general foreman of the wire drawing department
- · Joseph T. Wright has been appointed manager of the Compressor & Tool division, Holyoke, Mass., of the Worthington Pump & Machinery Corp. Mr. Wright served as assistant works manager of Lodge & Shipley Machine Tool Co. during World War I, subsequently organized J. T. Wright Co. of Cincinnati for the manufacture of paper drilling machines and other special equipment. This organization subsequently merged with Harris - Seybold - Potter Co., Dayton, Ohio, with which organization Mr. Wright served in several responsible capacities.
- George P. Watkins has been named office manager of the Atlanta Branch Warehouse of the Crucible Steel Co. of America. Mr. Watkins, a graduate of Duke University, was previously assistant to Crucible's Railway division sales manager, W. K. Krepps, in the New York executive offices.
- Mrs. Mary P. Hamilton has been elected president of the National Pressure Cooker Co., Eau Claire, Wis., to succeed her husband, Everett R. Hamilton, who died recently. The board of directors also elected Thomas G. Haney, sales manager, as treasurer. A. A. De Bonville, general manager, will have charge of the operation of the business with William E. Wahl as his assistant.
- C. P. Boggs has been named to the post of director of manufacturing for the Hygrade Sylvania Corp., New York. Mr. Boggs has held executive positions in the manufacturing division of Hygrade Sylvania Corporation since 1932. Recently, he was made assistant to executive vice-president W. E. Poor. Prior to his association with Hygrade Sylvania, Mr. Boggs was with the General Electric Co.
- Dr. Maurice C. Fetzer, formerly assistant professor of metallurgy at Pennsylvania State College, has joined the staff of the Carpenter Steel Co., Reading, as a research metallurgist. He is a graduate metallurgical engineer from the University of Minnesota and received the degree of Sc.D. from Harvard University.

OBITUARY ...



THE LATE H. A. Schatz, president, Schatz Mfg. Co. and Federal Bearings Co., Poughkeepsie, N. Y., who died March 16. He was 65 years old.

- Morris S. Towson, president and general manager, Elwell Parker Electric Co., Cleveland industrial truck makers, died March 17 at Orlando, Fla., aged 76 years. Mr. Towson had been connected with the Elwell-Parker Co. since 1895 when he started as a draftsman, subsequently advancing to the position of president, general manager and director in 1920.
- Herman A. Uihlein, president of the Ben-Hur Mfg. Co., Milwaukee, died March 13 at San Antonio, Tex., from a cerebral hemorrhage at the age of 55 years. He was a native of Milwaukee, graduate of Cornell University and studied law at Columbia University. In 1910 he became associated with the old Levine Gear Co., Milwaukee, later to become president of the company which several years ago changed its name to Ben-Hur Mfg. Co.
- Harvey Plummer, designing engineer with Cutler-Hammer, Inc., Milwaukee, died March 11 at his home from a heart attack. He went to Milwaukee from the Giddings & Lewis Co., Fond du Lac, Wis., and had worked for Cutler-Hammer only a week before he was stricken. He was 45 years old.

February Construction Valued At \$634,823,000

• • • Major engineering construction during February reached \$634,823,000, averaging \$158,706,000 a week for the four weeks of the month, and second only to the record average of \$191,733,000 reported in July, 1941. The current average topped all previous February records according to Engineering News-Records, and was 50 per cent higher than February, 1941, and up 26 per cent over January, 1942.

Federal construction carried the load in the increase, climbing 171 per cent over the average for February, 1941, and 32 per cent over last month. The stepped-up pace of federal work boosted public construction 98 per cent over a year ago and 22 per cent over the initial month of this year.

The tremendous volume of construction during the first two months of this year, \$1,263,603,000, is 25 per cent greater than the previous high established in 1941 during the same period. Federal construction, which made up 81 per cent of this total, was 118 per cent higher than during the initial two-month period of 1941, and was responsible for the 64 per cent increase in public construction as the state and municipal construction total decreased 47 per cent. Private building work, totaling \$120,405,000 for the two months, declined 62 per cent from the \$312,599,000 reported for January and February, 1941.

February Pool Bookings \$800,000 in Pennsylvania

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** • • • War orders totaling some \$800,000 were booked in February by five pool groups in Pennsylvania, according to A. A. Cutting, chief of the pooling division of the WPB's Pennsylvania Contract Distribution Branch. This total is in addition to contracts of some \$300,000 signed in January.

The pools, located in Allentown, Scranton, Philadelphia, Lansdale, and Lititz, Pa., represent a combination of 191 plants that are too small to receive prime contracts individually. Some have as few as one and two employees.

Weekly Bookings of Construction Steel in Tons

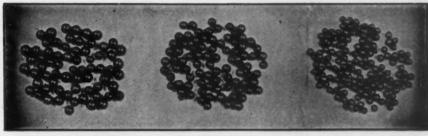
Week Ended >	Mar. 24,	Mar. 17,	Feb. 24,	Mar. 25,	Yearte	Date
	1942	1942	1942	1941	1942	1941
Fabricated structural steel awards	12,725	3,000	25,810	17,400	257,410	376,275
Fabricated plate awards	2,200	0	0	200	10,650	32,855
Sheet steel piling awards	0	0	0	230	790	6,445
Reinforcing bar awards	32,150	39,500	15,000	9,700	413,875	137,740
Total letting of Construction Steel	47,075	42,500	40,810	27,530	682,725	553,315

The newest pool, the General Sutter War Pool at Lititz, while not yet completed, has 14 membershops and already has acquired \$91,000 in orders. This pool is composed of woodworking shops and is making Army cots. The Lansdale group has orders calling for capacity operation until Aug. 1, and total business on the books by mid-February was set at \$666,-000. The Allentown pool has more than \$100,000 worth of contracts, and another comparatively new pool, the Rutledge National Defense Group in Philadelphia, went into February with \$8,000 worth of orders and picked up an additional \$100,000 worth during the month. This business has been

distributed among only six of its 32 member-shops to date.

At Scranton, the largest and busiest pool of all, the Lackawanna Valley Industries, has \$2,500,000 in contracts.

It was estimated that these five organizations are working on more than \$3,500,000 worth of war contracts, whereas last fall the individual members were considered far too small to undertake any part of the rearmament program. Mr. Cutting explained that the pools are all voluntary associations. Any member can take an order for himself, either to be handled in his own shop or sub-contracted at will to other members of the pool or to plants not in the pool.



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

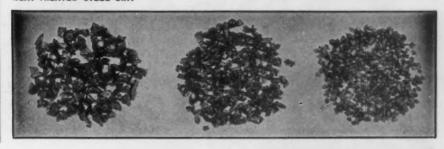
The unprecedented demand for our-

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

HEAT-TREATED STEEL GRIT



Machine Tool Dealers Break Bottlenecks

Cleveland

• • • Washington skeptics who believe that machine tool dealers have fallen into the category of being mere order takers would have had some severe setbacks if they had witnessed some of the difficult problems that machine tool dealers have successfully handled in helping war plants in this area to get into prompt war production. One outstanding problem was a situation where a plant had received a contract to produce fuse bodies and it was necessary to secure equipment to drill and tap a series of holes in these items, a job which had always been done on multiple spindle drilling and tapping equipment of a single purpose nature for large production.

However, this war plant was faced with the gloomy prospect of securing delivery for such equipment after a wait of six months or longer. A dealer consulting with this manufacturer and the war department arranged to get over 100 single spindle bench type drilling machines and hand clamping fixtures, which, when placed in production, will produce a similar number of fuse bodies in an equivalent time but at a slightly higher labor cost. Moreover, the cost of the initial installation and subsequent maintenance is not expected to exceed that of the multiple spindle equipment.

Meanwhile, the waiting time for this equipment had been cut down to only six weeks. The production line mentioned here is expected to be in operation within the month.

A very serious situation has arisen in equipment for making 37-mm, and 40-mm, shells. There have been so many orders let to produce these shells that deliveries of the necessary equipment are now on a six to seven months' basis, even on a A-1-a priority. This condition has overflowed into the plants of manufacturers with lesser known equipment, and for the present there appears to be quite a bottleneck in this situation.

Heavy orders continue to be

placed by the automobile industry in its conversion to 100 per cent war production.



Discusses 30% Advance Payments for Machine Tools

Cleveland

• • • It is reported that there is some confusion in machine tool circles over the conditions surrounding the 30 per cent cash down payment made by the customer and the 30 per cent cash advance made by the government to machine tool manufacturers who have pool orders. (see The Iron AGE, Dec. 25, 1941, and Feb. 26, 1942).

Briefly, the machine tool manufacturer and his dealers may request a 30 per cent cash advance from customers on "critical" tools, provided that the government has not already made that manufacturer a 30 per cent cash advance or loan against "pool" orders. In other words, manufacturers should not secure the cash advances on the same machine from both sources, giving him a total 60 per cent cash advance on the order. Instead, he should obtain a single advance from the initial purchaser whether it be the government or a private customer.

Some of the confusion arising over this situation is attributed to the fact that many Defense Plant Corp. contracts vary in their terms, and also that some manufacturers do not choose to ask for the 30 per cent cash advance from their customers to avoid bookkeeping details.

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Tool Plants Get Navy E

Cincinnati

• • • Knowledge that the efforts of local machine tool manufacturers are meeting with approval in Washington, came to the local industry when two Navy "Es" were awarded to machine tool manufacturers. These were the first symbols of excellence to be awarded in this area, the ceremonies of award taking place within two

days of each other. The first was awarded to the Lodge & Shipley Machine Tool Co., and the second to the Cincinnati Milling Machine Co. Despite this evidence of approbation of their past efforts, both companies, as well as other machine tool manufacturers in the area pledged themselves to ever increasing activity to lift production to higher levels.

As a concrete demonstration of this, the Cincinnati Shaper Co. announced the beginning of the construction of a new plant to augment the facilities of their present factory



Simplified Types Developed

Chicago

• • • • Four or five of the leading basic-type machine tool builders in the nation will probably be shipping "war machines" before many months. One of them, in this area, will be producing within two months at a rate that will be breathtaking compared to ordinary machine tool output.

The so-called "war machine" is based on the manufacturer's standard product, in this case to be confined to only two sizes. Where necessary, designs are changed to speed up production by simplification of the machine itself. Tooling and accessory equipment is stripped to the absolute bare necessities and a buyer simply has a "take it or leave it" choice on these machines.

The manufacturer in this area will use a special factory building for his war machines. His designs and the equipment he will offer are all settled.

Designs have been so simplified that the manufacturer actually expects to be able to turn out as many of this particular machine in one year as he has averaged in seven years of normal production on his entire line. With some of the other manufacturers undoubtedly as close to starting production as this one is, machine tool output of fundamentally needed machines will be stepped up greatly within six months.

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"Versatility" and "Speed" Characterize these two MARVEL SAWS

For the stockroom of this special furnace builder, what better combination could you ask ... a MARVEL No. 8 Metal Cutting Band Saw for versatility, and a MARVEL No. 4B High Speed Hack Saw for miscellaneous cutting-off.

For all-around versatility, the universal No. 8 Saw is unequalled. It will cut at any angle from 45° right to 45° left; will nip off a 1/8" drill rod or cut out an 18"x18" structural shape or solid bar. It has a large "T"-slotted planer type table for setting up big work and a quick action machine vise for small pieces. It has a com-bination hand and power feed. It does cuttingoff, mitering, notching and indexing, and saves hours of machining by roughing pieces and parts to size or shape. In many shops it eliminates warehouse delays and "cutting extras."

The MARVEL 4B Hack Saw is an exceedingly fast-cutting, light-duty saw (Capacity 6"x6") designed for high-speed cutting-off. It is designed for miscellaneous "run - of - the - shop work" and is surpassed in speed only by the heavy-duty, all-ball-bearing MARVEL 6, 6A, 9 or 9A High-Speed Saws.



ARMSTRONG-BLUM MFG. CO. "The Hack Saw People

THE IRON AGE, March 26, 1942-127

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NON-FERROUS METALS

. . MARKET ACTIVITIES AND PRICE TRENDS

RFC Spent \$11 Billion For Critical Materials

• • • In a report to the President on the activities of the R.F.C. and its subsidiaries, the extensive efforts made to obtain supplies of strategic and critical materials were disclosed. It was reported that up to March 7, a total of \$11,-494,438,962 was spent for loans and commitments. MRC made commitments of \$226,402,000 for the procurement of copper. Tonnage figures were not revealed, but commitments as of Oct. 22, 1941, totaled \$140,110,000, and represented 333,-380 tons of copper already delivered, 167,120 tons on order and 127, 650 tons for which the purchase contract had not been executed.

The increase in freight rates now in effect has had a marked effect on the cost of producing non-ferrous metals during the past week. However, no change has been reported in so far as sales were concerned, and its seems unlikely that OPA will permit the addition of this increase to the selling price of the metal. Producers will have to meet the extra cost.

Two general preference orders are scheduled to expire on March 31, Order M-38 on lead and Order M-11 on zinc. WPB announced that M-38 will be extended until Dec. 31, 1942, but has said nothing concerning the zinc order. In some quarters it is believed that WPB will take over the complete allocation of zinc. However, much can be said for the operation of the pool system that has worked out quite well, and was the basis for the pool system set up for lead distribution.

Following the FTC investigations of the activities of 90 primary copper producers, an investigation of the activities of 4000 scrap dealers, 2500 foundries, and some 80 melters of secondary copper and brass will be undertaken to determine inventories on hand and the compliance of these firms with conservation, priority, and allocation orders. Surveys will be conducted by 800 Wage and Hour Division inspectors acting as WPB agents.

Further price ceilings affecting the non-ferrous industry are cur-

rently forthcoming from OPA. A revision of the Price Schedule No. 82 on copper wire and cable and cable accessories, effective March 17, was announced, exempting prices of products sold under developmental contracts for the government, improving price control over new and specially designed materials, and simplifying manufacturers' reporting requirements. Meetings are being held with lead products fabricators to determine a fair price ceiling over these commodities, and maximum prices for several grades of segregated solid aluminum alloys not covered by Price Schedule No. 2 were suggested this week by OPA.

It was reported that the cost of the Texas City tin smelter will total \$5,000,000, and annual production will be about 51,600 tons of refined tin. Operations will begin next month, and tin concentrates sufficient for one year's operation are on hand. As previously announced, MRC set aside \$207,500,000 for the purchase of refined tin and \$129,900,000 for the purchase of tin ores and concentrates.

Non-Ferrous Prices

 (Cents per lb, for early delivery)

 Copper, Electrolytic¹
 12.00

 Copper, Lake
 12.00

 Tin, Straits, New York
 52.00

 Zinc, East St. Louis²
 8.25

 Lead, St. Louis³
 6.35

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼ c. for approximate New York delivery price, ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, 16.50c. a lb., New York; American, 14c. a lb., f.o.b. smelter. QUICK-SILVER, \$191 and \$193 per 76 lb. flask, f.o.b. shipping point. Brass Ingots, commercial 85-5-5-5, 13.25c. a lb.



New Division Is Set Up to Speed Demolition in U. S.

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• • • The effort to get out more iron and steel scrap settled further "into the groove" this week with appointment of a special salvage division by the Bureau of İndustrial Conservation.

The division will seek to expedite the movement of large scrap accumulations which are held up by obstacles such as uncertain ownership, clouded titles, high cost of demolition, remote locations, other red tape or complications. The move is one which has long been felt necessary by the scrap trade. Over 300,000 tons of rails are obtainable from abandoned street car tracks, while sunken vessels, abandoned oil wells, unused buildings and bridges hold additional thousands of tons. J. Widman Bertch

has been named chief of the new special projects division. Field offices will be located in 21 of the larger cities.

Meanwhile, an interesting step has been taken in Canada, where all auto wreckers have been ordered to sell old cars on hand within 90 days. In the intervening time they may take from old cars any parts they wish to keep for use or sale. Canada has undertaken supervision of distribution of scrap from war plants (prime contractors) and has been allocating this material to consumers of scrap.

Consumers began paying higher freight on iron and steel scrap last week, following OPA's decision that the surcharge might be added. Assembly yards will have to pay the added rate charge on shipments moving to yards where the material is shipped, meaning a reduced net for them.

Roughly, it is calculated the in-



GIVING AXIS THE GATE: Jack Nathan, shown donating cast iron gate at his home, 222 Cornelia Street, Brooklyn, for war-time use by the New York City Salvage Committee, headed by Clarence H. Low. Nathan's example was followed by several of his camera-shy neighbors.

Ransome. Welding Positioners in Victory Production

In many plants producing welded units for America's Victory, Ransome Positioners are saving untold production time. Properly holding intricate and often unwieldly parts, the machines bring the parts to convenient position for downhand welds, saving time and rod materials. Write for Bulletin 200-A.

INDUSTRIAL DIVISION RANSOME CONCRETE MACHINERY COMPANY Dunellen New Jersey





creased scrap rate will add \$3,000,-000 to steel and foundry buyers. This is based on the movement of 25,000,000 tons of purchased scrap at an average freight rate of \$2 per ton.

In explaining that steel mills may pay the new 6 per cent surcharge in railroad and truck transportation charges, OPA cited the following example: Basing point price at Chicago remains at \$18.75 per gross ton for No. 1 heavy melting steel. The old switching charge was 84 cents per gross ton. The shipper, under the old freight rates, would secure a net return of \$17.91 per ton. Under the new setup the shipper will still get \$17.91. However, the switching charge will be increased by 6 per cent to 89 cents per gross ton. Therefore, the mill consumer may pay \$18.80 for his scrap. This necessitates adjustment of the \$1 springboard. Under the original consumer that the strange of the strange o

nal schedule, no more than \$1 per gross ton over the price at the basing point nearest the consumer's plant might be paid. Now, no more than \$1 per ton plus the increase in transportation charges from shipping point to point of delivery may be paid.

Where a choice exists between water and rail routes, shippers are warned to choose water carrier if rates are lower.

The permissible "off the line" haul for scrap originating from basing point railroads has been changed from \$1 per gross ton to \$1.06 in the case of remelting scrap and from \$2 to \$2.12 in the case of scrap for rerolling.

Consumers of cast iron scrap are permitted to pay the additional transportation charges. In all cases, the new emergency transportation charge must be shown as a separate item in the billing.

In all cases, the new emergency transportation charge must be shown as a separate item in the billing.

In the case of allocation orders by WPB, where the shipping point price plus transportation charges will bring the delivered price beyond the springboard allowance, the consumer now is permitted to pay the additional transportation charges, without OPA approval.

262 Tons of Steel Scrap Collected in Plant Drive

Trenton, N. J.

• • • In the first report from one of the steering committees of industrialists set up to facilitate the collection of industrial scrap in plants and shops in Eastern Pennsylvania, New Jersey, Maryland, and Delaware areas, a total of 262 tons of iron and steel scrap was reported collected.

Waste Material Dealers **Urged to Greater Efforts**

• • • A plea for even greater efforts toward moving more old material at schedule prices, was made last Thursday in New York at the 29th annual banquet of the National Association of Waste Material Dealers, Inc., by David Feinburg, head of the David Feinburg Co., Medford, Mass., who was elected president of the Association for the coming year.

Col. Robert Falkenau, of the Quartermaster Corps, told the dealers at their annual convention that this nation was the most wasteful in the world "in the fatuous belief that it was so strong and important no supplies ever could be cut off."

New Scrap Club Formed

• • • The formation of the Steel Scrap Executives Club was announced in New York recently by Joseph A. Moskowitz, president. The club consists of yard dealers exclusively. Other officers are: vice-

president, Samual H. Bassow; secretary, Marvin Lipman; treasurer, A. A. Gerson.

PITTSBURGH-Due mainly to more open weather conditions, the scrap flow here was slightly easier last week, al-leviating for the time being at least any serious dislocation. Some of the improvement, it is said, can be traced to scrap gathering campaigns, including farm, city, automobile graveyard, and indus-trial drives. Most of such collections come in the category of non-recurring scrap and it is this feature which causes some apprehension over the long-term A small amount of nickel turnoutlook. ings sold here last week at below the maximum price but the advantage was short lived when other consumers in need of material bid the ceiling price. Machine shop turnings have not been sold at below the maximum ceiling price.

TORONTO-With the object of stimulating offerings of scrap and making larger tonnages of steel grades available to mills and other consumers producing steel for Canada's war effort, F. B. Kilbourn, steel controller, has issued an order to all automobile wreckers that old cars on hand must be sold within 90 days. Within the next three months wreckers must take from old cars on hand any parts they wish to keep for use or for sale. At the end of that period the Department of Munitions and Supply will remaining stocks, leaving over wreckers only such parts as may be deemed reasonable.

It was previously announced that the Steel Controller had taken on supervision of distribution of scrap from war plants, that is the prime contractors, and has been allocating this material to consumers in most urgent need of supplies. No interference is reported regarding secondary contractors and other scrap supplies.

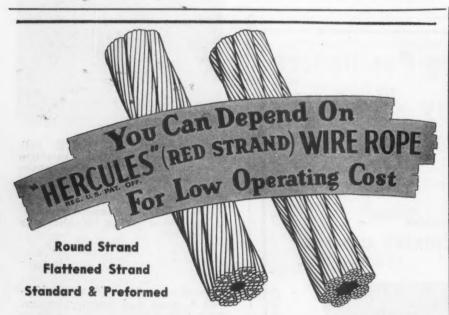
CLEVELAND-The large scale production of shells, machine tools, etc., is now bringing out large quantities of nickel-alloy turnings. As a result, it is reported that some sales of such turnings have been made at levels below OPA price ceilings, since the handling of this type of scrap involves various operational difficulties.

Steel mill representatives have held discussions in recent weeks with iron ore producers regarding the possibility of se-curing greater amounts of special "lump" ore for use in the open-hearth to make up for scrap shortages.
Auto "graveyards" i

in February Cuyahoga County yielded close to 2400 gross tons, whereas the entire house-tohouse campaign in Cleveland only brought out 850 tons of scrap.

The 31-mile Lorain, Ashland & Southern Railroad has been sold to Luria Bros., and the dismantling of this line will be under the supervision of Jack Levand, of the Simon-Levand Co

CHICAGO - Latest headache in this area is the proposed "Keys to Victory" collection drive about to be launched in suburban Evanston. Based on the theory that keys are made up of necessary metals, this drive proposes to collect all



WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally-not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By A. LESCHEN & SONS ROPE CO. Established 1857 5909 Kennerly Avenue, St. Louis, Mo.

San Francisco Seattle Portions of the old house and office building keys no longer used by the local citizens. With few exceptions, most public scrap drives have bogged down. International Harvester's drive through its 10,000 dealers has brought in scattered results, but nothing remotely sensational.

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sary t all Steel mills find no change in their scrap position here. One or two are comfortably fixed, others are living day-to-day. Dealers in smaller outlying towns are reported to still be expecting higher prices for their material. Reports have been heard that some trade schools pay over \$40 a ton for scrap used in their school shops for such things as welding practice, etc.

BOSTON—Yards continue to report increasing supplies of most kinds of scrap, but say the situation could be a whole lot better. Metalworking plants furnish a steady flow of turnings, borings and bundled material, which move to consumers rapidly. Barge owners report insurance rates almost prohibitive because of submarine activities along the Atlantic Coast.

BUFFALO—The scrap situation here is greatly improved. Scrap is coming in from the farms as result of a local drive, and auto graveyard shipments are better. Dealers report even cast scrap is coming in better. The consensus here is that there will be sufficient scrap this year for war needs, but not for civilian requirements.

Bethlehem Steel Co., anticipating that "present renewed efforts to bring out scrap" will result in a continuance of the recent improvement in scrap flow, has lighted four additional furnaces, bringing the district's rate up to 104 per cent of capacity. At present Bethlehem's scrap reserves are sufficient for only a few days' operations, but the company hopes to be able to squeeze through. Republic has also added another furnace in the Buffalo plant.

CINCINNATI — With allocations running a trifle more smoothly, the scrap situation in this area, while far from being pleasant, is a trifle easier. Dealers indicate that the flow of steel, as well as foundry scrap is a trifle better and compliance generally with Government regulations is reported to be good.

BIRMINGHAM — Receipt of increased tonnages of steel scrap, apparently resulting from allocations and more clement weather, is currently noticeable here. The increased flow is permitting steel mills to retain what little stock piles they possess. The situation on cast grades remains exceedingly tight.

ST. LOUIS—Receipts of scrap stepped up considerably during the last week, with the result that ingot operations continued at the same high rate to which they were increased the preceding period. The material is coming from nearby points and farms and automobile graveyards, the latter being especially active. Additional allocations include 600 tons to American Car & Foundry Co. and an undetermined tonnage to General Steel Castings.



BRINGING IN A NEW CROP: With the town of St. Peters, Mo., joining in the national scrap drive by International Harvester Co., the first day's collection there amounted to about 50 tons. International Harvester is conducting the drive through its 10,000 dealers. Farmers are given weight receipts for their scrap and are paid in full when the material is sold through established scrap channels. Great success has been achieved in some areas.



(All the prices given below are per gross ton and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

BA	SIC OPEN HEARTH GR		BLAST JRNACE GRADES			ELECTRI	C FURN	ACE, AC	D OPEN	HEART	H AND	FOUND	RY GRAD	ES	
	(No. 1 Heavy Meiting; No. 1 Hydr. Com- pressed Black Sheets;	PL	(Mixed Borings and Turnings;		Low Phos			vy Struc			Cut Auto		Alloy free Low	Heavy Axie and	
	No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)		Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punch- ings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	Phos. and Sulphur Turnings	Forge Turn, First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland Johnstown, Sharon, Canton Steubenville, Warren,				o.opo			Gilder	Onder	Cilder	Olider	Onder	Ondo			
Youngstown, Weirton	\$20.00	\$16.00	\$16.00	\$25.00	\$22.50	\$22.50	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00
Cleveland, Middletown, Cincinnati, Portsmouth Chicago, Claymont, Coatesvill Conshohocken, Harrisburg,	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Phoenixville, Sparrows Pt. Ashland, Ky	18.75 19.50 19.25	14.75 15.50 15.25	14.75 15.50 15.25	23.75 24.50 24.25	21.25 22.00 21.75	21.25 22.00 21.75	19.75 20.50 20.25	20.25 21.00 20.75	20.75 21.50 21.25	18.75 19.50 19.25	19.25 20.00 19.75	19.75 20.50 20.25	17.50 17.25	18.25 19.00 18.75	19.75 20.50 20.25
Bethlehem, Pa.; Kokomo, In Duluth, Minn. Detroit, Mich. Toledo, Ohio	18.00 17.85	14.25 14.00 13.85 13.85	14.25 14.00 13.85 13.85	23.25 23.90 22.85	20.35	20.75 20.50 20.35	19.25 19.00 18.85	19.75 19.50 19.35	20.25 20.00 19.85	18.25 18.00 17.85	18.75 18.50 18.35	19.25 19.00 18.85	16.00 15.85	17.75 17.50 17.35	19.25 19.00 18.85
St. Louis. Mo	17.50	13.50	13.50	22.50		20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Pittsburg, Cal.; San Franci Minnequa, Colo. Seattle, Wash. Portland, Ore.	16.50	13.00 12.50 10.60	13.00 12.50 10.50	22.00 21.50 19.50	19.00	19.50 19.00 17.00 15.50	18,00 17,50 15,50 14,00	18.00 16.00	18.50 16.50	17.00 16.50 14.50 13.00	17.00 15.00	18.00 17.50 15.50 14.00	14.50	16.50 16.00 14.00 12.50	18.00 17.50 15.50 14.00

Bundles with less than 50% tin coated material are \$5 per gross ton below basic open hearth grades; those with more than 50% tin coated material are \$8 below basic open hearth grades.

material are \$8 below basic open hearth grades.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or

maximum shipping point prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points, take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports \$1; New England \$1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than \$1, but not more than \$5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than \$5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton en consumer-owned unprepared remote scrap (see order).

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use in explosive making) add \$5 to price of cast iron borings; for chemical use outside explosives making, add \$3.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus estables.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consu mers' plants located on line.)

				S	crap Rai	is
Cleveland, Cincinnati.	No. 1 RR Heavy Melting	Scrap Rails	Rails for Reroiling	3 ft. and Under	2 ft. and Under	. 18 in. and Under
Ashland, Portsmouth, Middletown	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00
Sharon, Steubenville, Wheeling, Youngstown Chicago, Philadelphia.	21 00	22.00	23.50	24.00	24.25	24.50
Sparrows Pt., Wilmington. Birmingham, Los Angeles,	19.75	20.75	22.25	22.75	23.00	23.25
San Francisco	18.00 20.25	19.00 21.25	20.50 22.75	21.00 23.25	21.25 23.50	21.50 23.75
Detroit	18.85 19.00	19,85 20.00	21.35 21.50	21,85 22,00	22.10 22.25	22.35 22.50
Kansas City, Mo	17.00 19.25	18.00 20.25	19.50 21.75	20.00 22.25	20.25 22.50	20.50
St. Louis	15.50 18.50	16.50 19.50	18.00 21.00	18.59 21.50	18.75	19.00

CAST IRON SCRAP

Other Than Railroad Scrap

No. 1 cupoia cast	Group A \$18.00	Group B \$19.00	Group C \$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18,00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17,00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A Includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: states not named in A and B; switch district of Kansas City, Kan., Mo.

. . Comparison of Prices

(Advances Over Past Week in Heavy Type; Declines in Italics. Prices Are F.O.B. Major Basing Points)

Electric Furnace Bundles

\$21.00

19.78 20.50 20.28 19.28 19.60 18.88

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Flat Rolled Steel: M. (Cents Per Lb.)	1ar. 24, 1942	Mar. 17, 1942	Feb. 24 1942	Mar. 25, 1941	Pig Iron: Mar. 24 (Per Gross Ton) 1942	, Mar. 17, 1942	Feb. 24 1942	Mar. 25, 1941
Hot rolled sheets Cold rolled sheets Galvanized sheets (24 ga.) Hot rolled strip Cold rolled strip Plates Stain's c.r. strip (No. 302)	2.10 3.05 3.50 2.10 2.80 2.10	2.10 3.05 3.50 2.10 2.80 2.10 28.00	2.10 3.05 3.50 2.10 2.80 2.10 28.00	2.10 3.05 3.50 2.10 2.80 2.10 28.00	No. 2 fdy., Philadelphia. \$25.84 No. 2, Valley furnace 24.00 No. 2, Southern Cin'ti 24.06 No. 2, Birmingham 20.38 No. 2, foundry, Chicago† 24.00 Basic, del'd eastern Pa 25.34 Basic, Valley furnace 23.50 Malleable, Chicago† 24.00	\$25.84 24.00 24.06 20.38 24.00 25.34 23.50 24.00	\$25.84 24.00 24.06 20.38 24.00 25.34 23.50 24.00	\$25.84 24.00 24.06 20.38 24.00 25.34 23.50 24.00
Tin and Terne Plate: (Dollars Per Base Box Tin plate		\$5.00	\$5.00	\$5.00	Malleable, Valley 24.00 L. S. charcoal, Chicago 31.34 Ferromanganese‡ 120.00	24.00 31.34 120.00	24.00 31.34 120.00	24.00 30.34 120.00
Manufacturing ternés Bars and Shapes:		4.30	4.30	4.30	†The switching charge for deliver cago district is 60c. per ton. fFor carlots at seaboard.		ndries in	the Chi-
(Cents Per Lb.)								
Merchant bars Cold finished bars		2.15 2.65	2.15	2.15 2.65	Scrap: (Per Gross Ton)			
Alloy bars Structural shapes Stainless bars (No. 302)	$\frac{2.70}{2.10}$	2.70 2.10 24.00	2.70 2.10 24.00	2.70 2.10 24.00	Heavy melt'g steel, P'gh. \$20.00 Heavy melt'g steel, Phila. 18.75 Heavy melt'g steel, Ch'go 18.75	18.75 18.75	\$20.00 18.75 18.75	\$21.00 20.00 20.00
Wire and Wire Products: (Cents Per Lb.)					No. 1 hy. comp. sheet, Det. 17.85 Low phos. plate, Youngs'n 23.00 No. 1 cast, Pittsburgh 22.00	23.00	17.85 23.00 22.00	17.75 24.00 23.25
Plain wire	2.60 2.55	$\frac{2.60}{2.55}$	$\frac{2.60}{2.55}$	2.60 2.55	No. 1 cast, Philadelphia. 24.00 No. 1 cast, Ch'go* 21.00	24.00	24.00 21.00	25.75 21.25
Rails: (Dollars Per Gross To	n)			+	*Changed to gross ton basis April	3, 1941.		
Heavy rails	\$40.00	\$40.00 40.00	\$40.00 40.00	\$40.00 40.00	Coke, Connellsville: (Per Net Ton at Oven)			
Semi-Finished Steel: (Dollars Per Gross To	n)				Furnace coke, prompt \$6.00 Foundry coke, prompt 6.87			\$5.625 6.25
Rerolling billets	34.00	\$34.00 34.00	\$34.00 34.00	\$34.00 34.00	Non-Ferrous Metals: (Cents per Lb. to Large Buy	vers)		
Slabs Forging billets Alloy blooms, billets, slabs	40.00	34.00 40.00 54.00	34.00 40.00 54.00	34.00 40.00 54.00	Copper, electro., Conn.* 12.00 Copper, Lake, New York. 12.00 Tin (Straits), New York 52.00	12.00 12.00	12.00 12.00 52.00	12.00 12.00 52.50
Wire Rods and Skelp: (Cents Per Lb.)					Zinc, East St. Louis 8.25 Lead, St. Louis 6.35	8.25 6.35	8.25 6.35	7.25 5.60
Wire rods Skelp (grvd)	$\frac{2.00}{1.90}$	2.00 1.90	2.00 1.90	2.00 1.90	Antimony (Asiatic), N. Y. 16.50 *Mine producers only.	16.50	16.50	16.50
reve.								

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 132 to 140 herein.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . Composite Prices

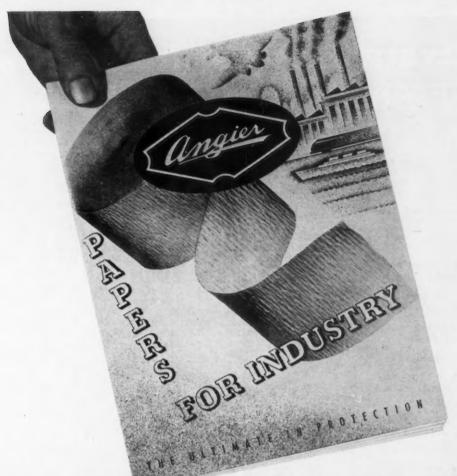
37 3 00	FINISHED ST	EEL	P	IG	IRON		STEEL
March 24,	19422.3046	7c. a Lb			Gross Ton		Gross Ton
One month	ago2.3040	7c. a Lb			Gross Ton		Gross Ton
One year	ago2.3046	7c. a Lb			Gross Ton		Gross Ton
	High	Low	High		Low	High	Low
1942	2.30467c.,	2.30467c.	\$23.61		\$23.61	\$19.17	\$19.17
1941	2.30467c.,	2.30467c.,	\$23.61, Mar.	20		\$22.00, Jan. 7	
1940	2.30467c., Jan.		23.45, Dec.		22.61, Jan. 2	21.83, Dec. 30	
1939	2.35367c., Jan.	3 2.26689c., May 16	22.61, Sept.	19	20.61, Sept. 12	22.50, Oct. 3	
1938	2.58414c., Jan.		23.25, June	21	19.61, July 6	15.00, Nov. 22	
1937		9 2.32263c., Jan. 4	23.25, Mar.		20.25, Feb. 16	21.92, Mar. 30	
1936	2.32263c., Dec. 2	28 2.05200c., Mar. 10	19.74, Nov.			17.75, Dec. 21	
1935		1 2.06492c., Jan. 8	18.84, Nov.	5	17.83, May 14	13.42, Dec. 10	
1934 1933		24 1.95757c., Jan. 2	17.90, May	1	16.90, Jan. 27	13.00, Mar. 13	
1932		3 1.75836c., May 2	16.90, Dec.			12.25, Aug. 8	
1931		5 1.83901c., Mar. 1	14.81, Jan.			8.50, Jan. 12	6.43, July 5 8.50, Dec. 29
1930		13 1.86586c., Dec. 29 7 1.97319c., Dec. 9	15.90, Jan.		14.79, Dec. 15 15.90, Dec. 16	11.33, Jan. 6 15.00, Feb. 18	
1929		28 2.26498c., Oct. 29	18.21, Jan. 18.71, May			17.58, Jan. 29	Transfer of the contract of
		ndex based on steel			ages for basic iron	Based on No.	
		ank plates, wire, rails,	at Valley furi	nace	s and foundry iron	steel scrap quota	tions to consumers
	black pipe, hot	and cold-rolled sheets	at Chicago,	Phi	ladelphia, Buffalo,	at Pittsburgh, Ph	iladelphia and Chi-
		esenting 78 per cent of ates output. Index re-	nati.	outh	ern iron at Cincin-	cago.	
	capitulated to	1929 in Aug. 28, 1941,					
	issue.						

Prices of Finished Iron and Steel ...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

													DELL	VERED	
Basing Point Product	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS Hot rolled	2.10¢	2.10€	2.10 €	2.10€	2.10€	2.10¢	2.10¢	2.10¢	2.20€	2.10¢		2.65¢	2.20€	2.34 €	2.27€
Cold rolled ¹	3.05€	3.05€	3.05¢	3.05€		3.05€	3.05€		3.15¢	3.05€		3.70€	3.15€	3.39¢	3.37€
Galvanized (24 ga.)	3.50€	3.50€	3.50 €		3.50¢	3.50¢	3.50€	3.50¢	3.60¢	3.50€		4.05¢		3.74¢	3.67€
Enameling (20 ga.)	3.35€	3.35€	3.35∉	3.35¢			3.35€		3.45€	3.35¢		4.00€	3.45¢	3.71¢	3.67€
Long ternes ²	3.80∉		3.80¢									-4.55¢			-
STRIP Hot rolled ³	2.10¢	2.10¢	2.10€	2.10€	2.10¢		2.10€			2.10¢		2.75¢	2.20¢	2.46€	
Cold rolled4	2.80¢	2.90∉					2.80€	(Wor	cester =	3.00¢)			2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20€			2.20¢		2.20€							2.56€	
Commodity C-R	2.95¢			2.95€			2.95€	(Wor	cester =	3.35∉)			3.05€	3.31€	
TIN PLATE Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
BLACK PLATE 29 gage ⁵	3.05€	3.05€	3.05€						3.15¢		*	4.05¢ (1•)			3.37∉
TERNES, M'FG. Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS Carbon steel	2.15¢	2.15¢	2.15¢	2.15∉	2.15∉	2.15¢		(Du	luth =2	.25¢)	2.50€	2.80¢	2.25€	2.49€	2.47 €
Rail steel ⁶	2.15¢	2.15∉	2.15¢	2.15¢	2.15€	2.15¢	1				2.50€	2.80¢			
Reinforcing (billet)	2.15	2.15¢	2.15¢	2.15∉	2.15€	2.15	2.15¢	2.15€			2.50¢	2.55€	2.25¢	2.39≰	
Reinforcing (rail)7	2.15	2.15¢	2.15€	2.15€	2.15€	2.15	2.15¢				2.50≰	2.55€	2.25∉		2.47€
Cold finished ⁸	2.65	2.65€	2.65€	2.65€		2.65			(Detro	t=2.70¢)			3.01 €	2.97 €
Alloy, hot rolled	2.70	2.70∉				2.70		Bethlehe	m, Mas	silon, Ca	nton =2.	70¢	2.80¢		
Alloy, cold drawn	3.35	3.35¢	3.35€	3.35¢		3.35	1						3.45¢		
PLATES Carbon steel	2.10	2.10€	2.10€	2.10¢	2.10¢		2.10¢		2.25¢(2.45¢	1	2.25¢	2.29¢	2.15¢
Wrought iron	3.80	1													
Floor plates	3.35	3.35€									3.70¢	4.00¢		3.71€	3.67
Alloy	3.50	4 3.50∉			(Coa	tesville	= 3.50¢)				3.95€	4.15		3.70€	3.37
SHAPES Structural	2.10	€ 2.10€	2.10		2.10	2.10	é	(Bethleh	em =2.1	0¢)	2.45¢	2.75		2.27€	2.218
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80	¢		2.80			(Wo	rcester =	3.00¢)						
0.51 to 0.75 Carbon	4.30	É		4.30	4		(Wo	rcester =	4.50¢)						
0.76 to 1.00 Carbon	6.15	É		6.15	É		(Wo	rcester =	=6.35¢)						
1.01 to 1.25 Carbon	8.35	é		8.35	É		(Wo	rcester =	=8.55¢)						
WIRE9 Bright	2.60	€ 2.60	4	2.60	€ 2.60	é	(We	orcester	=2.70¢)			3.10	¢		2.92
Galvanized	2.60	€ 2.60	4	2.60	¢ 2.60	É	(We	orcester	=2.70¢)			3.10	É		2.92
Spring	3.20	€ 3.20	É	3.20	é		(W	orcester:	=3.30¢)			3.80	¢		3.52
PILING Steel sheet	2.40	é 2.40	ė			2.40)é					2.95	¢		2.72
IRON BARS12															
Wrought single refined	4.40)¢													
Wrought double refine	d 5.40)¢											-		

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ⁵ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁶ Also shafting. For quantities of 20,000 to 39,999 lb. ⁶ Carload lot to manufacturing trade. ¹⁰ Boxed. ¹¹ Ship plates only. ¹³ Common iron bars quoted at 2.15c. by Terre Haute, Ind., producer. ^{**} Gulf and Pacific Ports prices shown here do not apply if the customary means of transportation (rail and water) is not used.



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SEMI-FINISHED STEEL

Rillete	Blooms	and	Slahe

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher.

Rerolling\$34.00 Forging quality 40.00 Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

3 in. to 12 in.\$52.00 12 in. to 18 in.54.00 18 in. and over56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Spar-rows Point, Md. Cleveland,

Open hearth or bessemer.....\$34.00

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.90c.

Wire Rods
(No. 5 to 9/32 in.) Per Lb.
Pittsburgh, Chicago, Cleveland. 2.00c.
Worcester, Mass. 2.10c. Birmingham ... 2.00c.
San Francisco ... 2.50c.

9/32 in. to 47/64 in., 0.15c. a lb. high-. Quantity extras apply. Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton,
Massillon, Buffalo or Bethlehem

n,	Syr	acuse)
		. 67c.
		. 54c.
		57½c.
		. 18c
		. 14c
	Bo	Base

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2				Low Phos-	
	Foundry	Basic	Bessemer	Malleable	phorous	Charcoal
oston	\$25.50	\$25.00	\$26.50	\$26,00		
rooklyn	27.50			28.00		
ersey City		26.03	27.53	27.03		
hiladelphia		25.34	26.84	26.34		
thlehem, Pa	\$25 00	\$24.50	\$26.00	\$25.50		
erett, Mass		24.50	26.00	25.50		
edeland, Pa		24.50	26.00	25.50		
		24.50	20.00	23.30	\$29.50	*****
elton, Pa			20.00	25 50		*****
dsboro, Pa		24.50	26.00	25.50	29.50	
arrows Point, Md		24.50	*****	22722		
ie, Pa	24.00	23.50	25.00	24.50		
ville Island, Pa	24.00	23.50	24.50	24.00		****
arpsville, Pa.*	24.00	23.50	24.50	24.00		*****
ffalo		23.00	25.00	24.50	29.50	
ncinnati		24.61		25.11		
nton, Ohio		24.89	25.89	25.39		
insfield, Ohio		25.44	26.44	25.94		
Louis		24.02	20.11	20.01		
		23.50	24.50	24.00		\$31
icago			24.50	24.00		
anite City, Ill		23.50				*****
eveland		23.50	24.50	24.00		
milton, Ohio		23.50		24.00	*****	
ledo		23.50	24.50	24.00		
ungstown*		23.50	24.50	24.00		
etroit	24.00	23.50	24.50	24.00		
ke Superior fc						\$28.00
les, Tenn. fc.†						33.00
Paul			27.13	26.63		
aluth			25.00	24.50		
rmingham		19.00	25.00			
s Angeles			*****		*****	*****
n Francisco			*****		*****	*****
attle				*****	*****	*****
ovo, Utah					****	*****
ontreal	. 27.50	27.50				
oronto	25.50	25.50		26.00		

GRAY FORGE IRON

Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent). Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

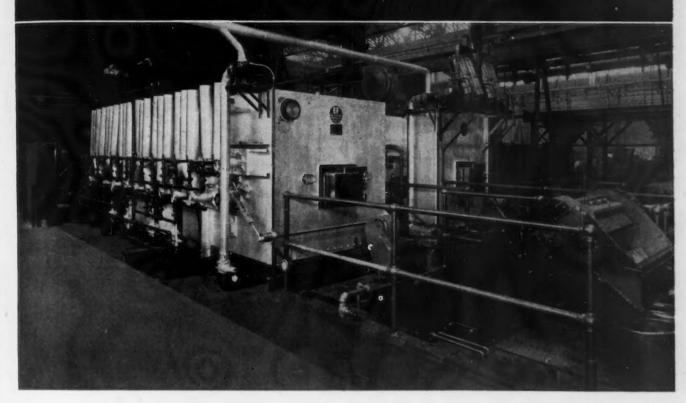
†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace. Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES (Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 19)

apply for distocuted t	connage	surpmen	us whe	n the j.	o.o. city	prices	are usea	in conj	ormance	with 2	scneaute	49.)	
	Pitts-		Cleve-	Phila-	New				Birm-	St.	St.	Mil-	Los
	burgh	Chicago	land	delphia	York	Detroit	Buffalo	Boston	ingham	Louis	Paul	waukee	Angeles
Sheets, hot rolled	\$3.35	\$3.25	\$3.35	\$3.55	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.50	\$3.38	\$4.65
Sheets, cold rolled		4.10	4.05	4.05	4.60	4.30	4.30	4.68		4.24	4.90	4.23	6.85
Sheets, galvanized	4.65	4.85	4.62	5.05	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.85
Strip, hot rolled	3.60	3.60	3.50	3.51	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	5.00
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46		3.61	3.83	3.54	
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.50
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.50
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.50
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75		7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05		6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88		8.77	8.84	8.63	10.55
Bars, ed. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23		7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Cold rolled sheets, and cold rolled sheets, 400 to 1499 lb.; St. Paul. galvanized and cold rolled sheets, any quantity, hot rolled sheets, hot rolled sheets, 0 to 1999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.43.

Now is the time to GET THE MOST OUT OF EVERY B.T.U.!



Here's why heat losses are cut to a minimum with Armstrong's Insulating Fire Brick

TODAY, maximum production is vitally important. In heat treating equipment Armstrong's Lightweight Refractories will help increase capacity. Three qualities of Armstrong's Insulating Fire Brick help furnaces to operate at peak efficiency:

Other

rcoal

\$31.34

d Steel

within

ed 50c. cent). on for

exceed

etails

sarily

ngeles 34.65 6.85

5.00

 $4.50 \\ 4.50$

6.60 9.55 8.55 10.55 9.55

vanized Excep-Detroit, 71 in. 99 lb., n. and rolled 99 lb.;

Los

HIGH INSULATING EFFICIENCY: Armstrong's Brick aid in the uniform distribution of heat throughout the furnace, permit more flexible temperature control, and effectively reduce fuel costs.

LOW HEAT STORAGE: The low

weight of Armstrong's Brick provide faster heating and cooling in intermittent type furnaces. This permits more cycles per day and with less fuel per cycle.

HIGH PHYSICAL STRENGTH: With Armstrong's Brick, strength has not been sacrificed to attain light weight and low conductivity. Every type is highly resistant to spalling and has exceptionally high crushing and breaking strength (hot and cold), as well as ample refractoriness for the use intended. Ability to stand up in service means less time

This Electric furnace company unit heats 1,500 lbs. of steel per hour to 1550° F. It is a gas fired, recuperative, radiant tube type furnace for scale-free and commercially "decarb-free" hardening and drawing. It is lined with Armstrong's Insulating Refractorics.

lost for maintenance and repairs.

Armstrong's Brick reach the job in good condition and lay up quickly. They are made in special shapes to order and in standard sizes which are easily notched, grooved, and shaped right on the job.

For engineering service and facts about the five types of Armstrong's Insulating Refractories for temperature ranges from 1600° F. to 2600° F., write now to Armstrong Cork Co., Insulating Refractories Dept., 978 Con-

cord Street, Lancaster, Pa.





CORROSION	AND	HEAT-
RESISTIN	G STE	EL

(Per 1b. base price, f.o.b. Pittsburgh)

Chrom	 Nin	Lal	AII	-

	No. 304	No. 302
Forging billets	.21.25c.	20.40c.
Bars	.25.00c.	24.00c.
Plates	.29.00c.	27.00c.
Structural shapes	.25.00c.	24:00c.
Sheets	.36.00c.	34.00c.
Hot rolled strip	.23.50c.	21.50c.
Cold rolled strip	.30.00c.	28,00c.
Drawn wire		24,00c.

Straight-Chromium Alloys

	No. 410 1	No. 430	No. 442	No. 446
F.Bille	ts15.73c.	16.15c.	19.13c.	23.38c.
Bars .	. 18.50c.	19.00c.	22.50c.	27.50c.
Plates	.21.50c.	22.00c.	25.50c.	30.50c.
Sheets	.26.50c.	29.00c.	32.50c.	36.50c.
Hotstri	p 17.00c.	17.50c.	24.00c.	25.00c.
Cold st	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

												,	No. 304
Plates						*	*		*	*			18.00c.*
Sheets				*	*			*					19.00c.

^{*}Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

										Per Lb.
Field grade	*				*					3.20c.
Armature										
Electrical							*			4.05c.
*Motor										4.95c.
*Dynamo										
Transformer										
Transformer	6	5								7.15c.
Transformer	5	8								7.65c.
Transformer	5	2								8.45c.

Silicon strip in colls—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for colls. Pacific ports add 75c. per 100 lb.
*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

			20x14 in.	20x28 in.
8-lb.	coating	I.C	\$6.00	\$12.00
15-lb.	coating	I.C	7.00	14.00
20-lb.	coating	I.C	7.50	15.00
25-lb.	coating	I.C	8.00	16.00
30-lb.	coating	I.C	8.63	17.25
40-lb.	coating	I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birming-ham or Chicago) Per Cent Off List

Machine and Carriage Bolts:

					-										
61/2	in., :	sho	rt	er	8	in	d	SI	na	11	e	r.		.65	1/2
6 x	5/8 ir	1.,	an	d	sh	101	rte	er						.63	1/2
11/8	in. a	nd	la	r	re	r.	a	11	le	n	gri	th		.59	
	6 x 6 in. 1 1/8 All Lag	6 x % in 6 in. by 1% in. a All diam Lag, all	6 x % in., 6 in. by % 1 % in. and All diamete Lag, all si	6 x % in., and 6 in. by ¾ to 1 ½ in. and la All diameters Lag, all sizes	6 x % in., and 6 in. by % to 1 1 % in. and larg All diameters of Lag, all sizes.	6 x % in., and sh 6 in. by ¾ to 1 in 1½ in. and large All diameters ove Lag, all sizes	6 x % in., and shot 6 in. by ¾ to 1 in. 1 ½ in. and larger, All diameters over Lag, all sizes	6 x % in., and short 6 in. by % to 1 in. ar 1% in. and larger, a All diameters over 6 Lag, all sizes	6 x % in., and shorter 6 in. by % to 1 in. and 1% in. and larger, all All diameters over 6 i Lag, all sizes	6 x % in., and shorter 6 in. by % to 1 in. and sl 1% in. and larger, all le All diameters over 6 in. Lag. all sizes	6 x 5% in., and shorter 6 in. by 34 to 1 in. and sho 1 1% in. and larger, all len All diameters over 6 in. le Lag, all sizes	6 x % in., and shorter 6 in. by % to 1 in. and shor 1% in. and larger, all length All diameters over 6 in. lor Lag, all sizes	6 x % in., and shorter 6 in. by % to 1 in. and shorte 1% in. and larger, all length All diameters over 6 in. long Lag, all sizes	6 x % in., and shorter 6 in. by % to 1 in. and shorter 1% in. and larger, all length. All diameters over 6 in. long. Lag, all sizes	6½ in., shorter and smaller65 6 x 5% in., and shorter63 6 in. by ¾ to 1 in. and shorter.61 1½ in. and larger, all length59 All diameters over 6 in. long59 Lag. all sizes

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)	
½ in. and smaller6	2
9/16 to 1 in. inclusive5	9
1% to 1½ in. inclusive	7
1% in and larger 5	6

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E
7/16 in. and smaller	* *	64
½ in. and smaller	62	
½ in. through 1 in		60
9/16 to 1 in	59	
11/8 in. through 11/2 in		58
1% in. and larger	56	

	In	full	container	lots,	10	per	cent	addi
ı	iona	1 dis	scount.					

Stove	bolts,	p	ackag	es		n	u	ts	3	1	00)8	e	
Stove	bolts	in	packa	ag	e	S,	V							10 s
atta	ched													

On stove bolts freight allowed up to 65c, per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

	(1/	200	200 / 1	larger)	
	1 72	176.	ence i		per 100 lb.
F.o.b.	Pittsbu	reh.	Cle		
					\$3.75

Small Rivots

	(7/16 in	. and	smaller)		
** *		~	Per sent		81
F.o.b.	Pittsburgh	ı, Cle	veland, Ch	11-	
cago	o, Birming	ham	65	and	5

Cap and Set Screws Per cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and	2000
smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
	46
Encight allowed up to 650 per 100	11.

Freight allowed up to 65c, per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham) Base per Keg \$2.55

		150	(ES)	9€	72	er	reg
Standard wire nails						.\$	2.55
Coated nails							2.55
Cutnails, carloads							3.85
Annealed fence wire	a	9€	p	eı	. 1	.8	3.05
		B	as	80	0	ol	umn
Woven wire fence*							
Fence posts (carloads).							69
Single loop bale ties							59
Galvanized barbed wiret							70
Twisted barbless wire							70

*15½ gage and heavier. †On 80-rod spools in carload quantities.
Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall (Net base prices per 100 ft., f.o.b. Pitts-burgh, in carload lots)

Lan

					Seamless		Weld
					Cold	Hot	Hot
				D	rawn	Rolled	Rolled
					\$	\$	\$
	in.	o.d.	13	B.W.G.	15.03	13.04	12.38
1/				DITTO			

21½ in. o.d. 12 B.W.G. 20.21 17.54 16.58 3 in. o.d. 12 B.W.G. 22.48 19.50 18.35 3½ in. o.d. 11 B.W.G. 28.37 24.62 23.15 4 in. o.d. 10 B.W.G. 35.20 30.54 28.66

(Extras for less carload quantity	ies)
40,000 lb. or ft. over	. Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5.000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	
Under 2,000 lb. or ft	

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe)

Base Price-\$2.00 Per Net Ton

Steel (Butt Weld)

½ in	Black 63 ½ 66 ½ 68 ½	Galv 51 55 57½
Wrought Iron (Butt We	old)	
½ in. ¾ in. 1 and 1¼ in. 1½ in. 2 in.	24 30 34 38 37 ½	3½ 10 16 18½ 18
Steel (Lap Weld)		
2 in	61 64 66	49½ 52¼ 54½
Wrought Iron (Lap We	(d)	
2 in	30½ 31½ 33½ 33½ 32½	12 14 1/2 18 17
Steel (Butt, extra strong	, nlain e	nds)
½ in	Black 61½	Galv
Wrought Iron (Same as	Abora)	
½ in	25 31 38	6 12 191⁄2
Steel (Lap, extra strong	z. plain e	nds)
2 in	59 63 66 ½	48½ 52½
Wrought Iron (Same a	s Abore)	,
2 in	33½ 39	15½ 22½ 21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld 8 in. and smaller.

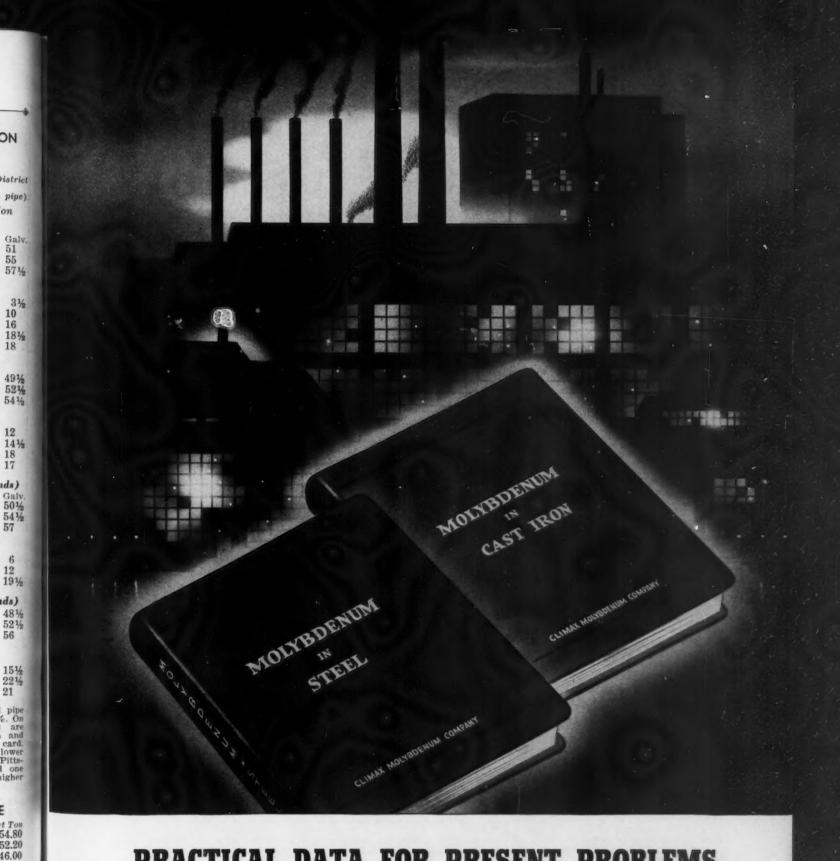
CAST IRON WATER PIPE

6-in. and larger, del'd Chicago. \$54.80 6-in. and larger, del'd New York 52.20 6-in. and larger, Birmingham . . 46.00 6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle 56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

FLIFI OIL

						_		
N	To.	3,	f.o.b.	Bayor	ne, l	N. J.		. 5.20c.
N	To.	6	f.o.b.	Bayo	nne,	N. J		.3.21c.
N	lo.	6	Bur. S	Stds., d	lel'd	Chica	ago.	.4.50c.
N	lo.	3	distill	ate del	l'd C	levela	and.	. 6.50c.
N	To.	4	indus.	, del'd	Clev	relan	d	. 6.00c.
N	In	6	indus	del'a	Cle	vela	nd	.5.00c.



PRACTICAL DATA FOR PRESENT PROBLEMS

Here are two books designed to help users of Molybdenum steels and irons to conserve all alloying elements, and possibly steel and iron, by getting the most in the way of strength, toughness and wear resistance with the lowest alloy content.

56.00

4-in. hown For s \$45 Chi-

3.21c. 1.50c. 3.50c.

.00c.

"MOLYBDENUM IN STEEL" covers the fundamental metallurgy of Molybdenum steels. Heat treatment - physical properties - applications - of a number of these steels are treated at length.

"MOLYBDENUM IN CAST IRON" covers the effect of Molybdenum in gray iron, giving suggested analyses for practical applications and detailed discussion of high strength (60,000 p.s.i. and up) irons.

Both books will gladly be sent free on request.

		RAILS, TRACK SUPPLIES
FERROA	LLOYS	(F.o.b. Mill) Sandard rails, heavier than 60
Ferromanganese	Silico-Manganese	lb., gross ton\$40.00
F.o.b. New York, Philadelphia,	(Per Gross Ton, Delivered, Lump Size,	Angle bars, 100 lb
Baltimore, Mobile or New	Bulk, on Contract)	Light rails (from billets) \$40.00
Orleans, Domestic, 80%, per	3 carbon	Light rails (from rail steel) 39.00
gross ton (carloads)\$120.00	2 carbon	Base per Lb.
	1 carbon	Cut spikes 3.00c.
6-11-1		Screw spikes 5.15c.
Spiegeleisen Per Gross Ton Furnace	Other Ferroalloys	Tie plates, steel
Domestic, 19 to 21%\$36.00	Ferrotungsten, per lb. con-	Track bolts, heat treated, to
Domestic, 26 to 28%	tained W, del'd carload \$2.00	railroads 5.00c.
Domestic, 20 to 20 /0 43.00	Ferrotungsten, 100 lb. and less 2.25	Track bolts, jobbers discount 63-5
	Ferrovanadium, contract, per	
Electric Ferrosilicon	lb. contained V, del'd \$2.70 to \$2.90†	Basing points, light rails—Pittsburgh,
(Per Gross Ton, Delivered Lump Size)	Ferrocolumbium, per lb. con-	Chicago, Birmingham; spikes and tie
50% (carload lots, bulk)\$74.50	tained Cb, f.o.b. Niagara	plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo, Birmingham and Pacific Coast ports; tie plates alone—
50% (ton lots, packed) 87.00	Falls, N. Y., ton lots \$2.25†	City, Minneaqua, Colo., Birmingham and
75% (carload lots, bulk)135.00	Ferrocarbontitanium, 15-18 Ti,	Steelton, Pa., Buffalo: spikes alone—
75% (ton lots, packed)151.00	7-8 C, f.o.b. furnace, carload,	Steelton, Pa., Buffalo; spikes alone— Youngstown, Lebanon, Pa., Richmond, Va.
	contract, net ton\$142.50	
CH	Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload,	FLUORSPAR
Silvery Iron	contract, net ton\$157.50	Fire Clay Brick Per Net Ton
(Per Gross Ton, base 6.00 to 6.50 Si)	Ferrophosphorus, electric or	
F.o.b. Jackson, Ohio\$29.50*	blast furnace material, car-	Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois
Buffalo30.75*	loads, f.o.b. Anniston, Ala.,	mines, all rail\$25.00
For each addition 0.50% silicon add \$1 a ton. For each 0.50% manganese over	for 18%, with \$3 unitage	Domestic, f.o.b. Ohio River land-
1% add 50c. a ton. Add \$1 a ton for	freight, equaled with Rock-	ing barges 25.00
0.75% phosphorus or over. *Official OPACS price established June	dale, Tenn., gross ton \$58.50	No. 2 lump, 85-5 f.o.b. Kentucky
24.	Ferrophosphorus, electrolytic	and Illinois mines 25.00
	23-26%, carlots, f.o.b. Mon-	Foreign, 85% calcium fluoride,
	santo (Siglo), Tenn., \$3 unit-	not over 5% Si, c.i.f. Atlantic
Bessemer Ferrosilicon	age, freight equalized with	ports, duty paidNominal
Prices are \$1 a ton above Silvery Iron	Nashville, gross ton \$75.00	Domestic No. 1 ground bulk, 96
quotations of comparable analysis.	Ferromolybdenum, per lb. Mo,	to 98%, calcium fluoride, not
	f.o.b. furnace 95c.	over 2½% silicon, f.o.b. Illi-
Ferrochrome	Calcium molybdate, per lb.	nois and Kentucky mines\$34.00
(Per Lb., Contained Cr. Delivered Car-	Mo, f.o.b. furnace 80c.	As above, in bags, f.o.b. same
lots, Lump Size, on Contract)	and the contract of the contra	mines 36.40
4 to 6 carbon	48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa 80c.	
2 carbon19.50c.	Molybdenum oxide, in cans. per	REFRACTORIES
1 carbon	lh contained Mo foh Lan-	(F.o.b. Works)
0.10 carbon	geloth and Washington Pa 80c	Fire Clay Brick Per 1000
0.06 carbon	geroui, and washington, 1 a. occ.	Super-duty brick, St. Louis\$64.60
Spot prices are 4c. per lb. of contained	*Spot prices are \$5 per ton higher.	First quality, Pennsylvania,
chromium higher.	†Spot prices are 10c. per lb. of contained element higher.	Maryland, Kentucky, Missouri
	The state of the s	and Illinois 51.30
		First quality, New Jersey 56.00
		Second quality, Pennsylvania,
0	RES	Maryland, Kentucky, Missouri
		and Illinois 46.55
Lake Superior Ores (51.50% Fe.) (Delivered Lower Lake Ports)	Brazilian, 46-48 Mn67c. to 68c.	Second quality, New Jersey 51.00
Per Gross Ton	Cuban, 51 Mn81c.	No. 1, Ohio
Old Range, bessemer, 51.50\$4.75	Per Short Ton Unit	Ground fire clay, net ton 7.60
Old range, non-bessemer, 51.50. 4.60	Tungsten, Chinese, Wolframite,	Silica Brick
Mesaba, bessemer, 51.50. 4.60	duty paid, delivered\$24 to \$26	Pennsylvania\$51.30
Mesaba, non-bessemer, 51.50 4.45	Tungsten, domestic scheelite, at mine\$24.00 to \$25.00	Chicago District 58.90
High phosphorus, 51.50 4.35	Chrome ore, lump, c.i.f. Atlantic	Birmingham 51.30
	Seaboard, per gros ton;	Silica cement, net ton (Eastern) 9.00
Foreign Ores*	South African (low grade)\$28.00	omea coment, net ton (Dastern)
(C.i.f. Philadelphia or Baltimore,	Rhodesian, 45	Chrome Brick Per Net Ton
Exclusive of Duty) Per Unit	Rhodesian, 48Nom.	Standard, f.o.b. Baltimore, Plym-
African, 46-48 Mn66.5c. to 68c.		outh Meeting and Chester\$54.00
Indian, 48-50 Mn 68c. to 70c.	*Importations no longer readily avail-	Chemically bonded, f.o.b. Balti-
	able. Prices shown are nominal.	more, Plymouth Meeting and
C	OKE*	Chester, Pa 54.00
Furnace	By-product, Chicago\$12.25	Magnesite Brick
Connelleville prompt	By-product, New England\$13.75	Standard f.o.b. Baltimore and
†Connellsville, prompt\$6.00		Chester\$76.00
Foundry	By-product, Newark. \$12.40 to \$12.95	Chemically bonded, f.o.b. Balti-
†Connellsville, prompt. \$6.75 to \$7.00	By-product, Philadelphia\$12.38	more 65.00
*Maximum hy-product colo price-	By-product, Cleveland\$12.30	
*Maximum by-product coke prices es- tablished by OPA became effective Oct.	By-product, Cincinnati\$11.75	Grain Magnesite
1, 1941. A complete schedule of the ceil-	By-product, Birmingham\$8.50†	Domestic, f.o.b. Baltimore and
ing prices was published in The Iron Age, Sept. 25, p. 94B. Maximum beehive		Chester in sacks\$44.00
furnace coke prices established by OPA,	- P	Domestic. f.o.b. Chewelah, Wash.
Jan. 26. †F.O.B. oven.	By-product, Buffalo\$12.50	(in bulk)

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THE IRON AGE PRIORITIES SECTION

... Prepared by the Priorities Staff of The Iron Age for use of industry and Government offices dealing with wartime controls of materials and machinery

WARNING

To do business under wartime conditions, industry in the United States and Canada must keep itself informed as to the LATEST developments in Priority Controls.

Please destroy earlier editions of The Iron Age Guide. Use only this FIFTH Edition.

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REVISIONS: Each week revisions for keeping this Priorities and Allocation Guide up to date appear in The Iron Age. They are printed on the Priorities and Price Page. See The Iron Age for complete details and interpretations of War Production Board orders affecting the metal industries.

THE IRON AGE, 100 E. 42nd St., New York, N. Y.

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Index to Material and Equipment

Numbers following each index subject indicates orders affecting that product. P orders are listed on p. 5, M orders on p. 9, L orders on p. 12, and other orders on p. 14.

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American Can Co.—P-42-a
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Repairs

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How to Use This Guide

To determine what priority or price controls are in effect on a product, or material used by the metal working industry, first locate this product in the alphabetical index on page 2. This index will show all orders affecting the product. Locate these references in the list of orders (P Orders, M Orders, etc.) on pages 5 to 14.

These lists of orders will tell, briefly, the nature of any order affecting the metal working industry, when it went into effect, what forms to use to operate under the order and what preference rating has been assigned by the orders.

To determine the nature of the various forms which must be filed to operate under an order (these are listed under the column "Related Forms"), refer to the section, "Forms to Use with Priority Orders" on page 16. If you have received a priority order and want to know how to extend it to your suppliers, see "How to Extend P Orders," page 21.

If you want help or information on an order, inquire at the nearest priority field office, listed on page 22.

If you want to know on what grounds WPB will grant relief from the terms of various curtailment and conservation orders, see page 15. On page 24 is a flow chart which shows the steps taken in handling a typical application for a priority rating.

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Description of Priority Orders

(See "FORMS TO USE WITH PRIORITY ORDERS," page 16, for description of forms listed under column Related Form. See section "HOW TO EXTEND 'P' ORDERS," page 21, for explanation of extension procedure. Numbers in brackets refer to effective date.)

"P" Orders

Order Sumber Material Covered 1Material for production	Related Form	Rating Assigned	Order Number P-10N	Material Covered Interial and equipment	Related Form	Rating Assigned
of e lectric traveling cranes (3-12-41). Revoked by P-5		A-1-c	ei o	ntering into conversion f ships (6-19-41)	(PD-41) . (PD-41-a)	AA
Material for production of machine tools (3-28-41). Revoked by P-11			o. n	faterial for production f metal working equipment (7-1-41). Supereded by P-11-a		
3Material for production of airframes (4-29-41). Superseded by P-109	.PD-13	A-1-d	0:	Interial for production f metal working equipment (9-30-41). Revokes	PD-81a	A-1-a, b,
4 Material for production of airplane engines and propellers (4-29-41). Superseded by P-109	PD-14	A-1-c	P-12A	2-11	PD-115	
5Material entering into		. , , , , , , ,	Ž.	1-1-c	.PD-40	A-10
production of cranes and hydraulic bridge brakes (5-26-41). Re- vokes P-1. See P-5-a	.PD-6	A-1-a	t	Material for produc- ion of Curtiss Wright irframes (7-3-41). Superseded by P-109		A-1-b
Amendment (6-14-41). 5-aMaterial for production of cranes and hoisting equipment (8-1-41). See P-5-b.		A-1-2	f	faterial and equipment or construction of hipways in 1941 (7-2-41)	{ PD-56 } . PD-56-a {	A-1-a
-5-bMaterial for production of cranes and hoisting equipment (10-1-41). Supersedes P-5-a	PD-81		f	Material and equipment for construction of hipways in 1942 and 943 (7-12-41)		A-1-b 1942
P.6Defense supplies rating plan (5-31-41). Super-seded by P-90	1 0-00	mgner	I	Material for electrical relays and solenoid as- e m b lies (7-11-41). Superseded by P-109	(PD-57).	A-1-d
Amendment No. 2 (1-3-42) extends rating to civil air Patrol and po-	PD-25-c-1 \\ PD-25-c-2 \	A-10	t t	Material for commer- tial radio receiving, ransmitting and direc- tional equipment (7-11- 11). Revoked 1-28-42		А-1-е
lice agencies. 7Material and equipment entering into production of merchant ship (construction (6-12-41).	PD-30 \	A-1-a 1941 A-1-b 1942	4	of canning machinery 7-9-41). Expired 8-31-41. See P-42, 42-a and		A-2
2.8 Material for freight car construction (6-18-41). Amendment No. 1 (11- 29-41) explains reports	PD-38 \		P-18I	Material entering into production of cutting tool equipment (7-31-11). Revoked by P-18-a		
to be filed. Interpretation No. 1 (2-3-42) limits use of rating to material to be physically incorporated			C	Material for production of cutting tools (8-28-11). Supersedes P-18	PD-6 Rev.	A-1-a
into freight cars.			t	Material for construc- ion of defense projects outside of U. S. (7-18- 11)	PD-63 PD-63-a PD-200 .	*
Material for aircraft parts. Superseded by P_{-109} .	Non		t	Material for construc- ion of defense projects limited to the Priori- ies Critical List) (7-		

Order Number	Material Covered 18-41). Check with WPB before using as	Related Form	Rating Assigned	P-25-dG	Material Covered asoline and diesel en- ines for light tanks 3-11-41)	Related Form		Order Number P-42
D 10 b	to whether this order or P-19 applies before susing		*	P-25-eM	aterial for production light tanks (10-14-			
	tion of certain defense projects (7-30-41)		*	P-26-aPa	arts, equipment and	.PD-81	A-1-f	P-42-a.
P-19-c.	Material for specified publicly financed defense houses with protected delivery dates		*	P-26-bM	ecessories for medium inks (8-11-41)			P-43
P-19-d.	Material for privately financed housing projects (9-9-41)		*	P-26-c37	arts, accessories, etc. 3-11-41)	.PD-81	A-1-d	
Р-19-е.	Material for highway projects (10-18-41) Amendment No. 1 (3-	.PD-81	*	(8	uns for medium tanks 3-11-41)	.PD-81		
	Amendment No. 1 (3-16-42) prohibits use of ratings for road building machinery			gi (8	asoline and diesel en- ines for medium tanks 3-11-41)	.PD-81		P-45
P-19-g.	.U. S. housing projects (does not cover copper or pipe) (12-31-41)	.PD-81		ef	aterial for production medium tanks (10-41)	.PD-81	A-1-d	P-45-a.
P-19-h.	Provides defense hous- ing builders with sim- plified method of ex-			pl A	ealth supplies rating an (8-25-41) mendment No. 1 (9- 0-41). Revises list of	{ PD-79 }	A-10	
P-20	tending ratings on any rated project (3-4-42). Material for construc-	PD-200-a		he A 14	ealth items. mendment No. 2 (2- 1-42) simplifies exten-			P-46
	tion of specified loco- motives (7-21-41) Amendment No. 1 (11- 29-41) clarifies reports to be filed. Interpretation No. 1 (2- 3-42) limits use of rat-		A-3	P-31M ti m	on procedure. [aterials for produc- on of foundry equip- ent and repair parts]-5-41)	.PD-81	A-1-b	
D. 04	ings to material physically incorporated in locomotives.			an ch	arts for maintenance and repair of farm ma- ninery (8-20-41). Re- oked by P-95	(PD-81)	A-10	P-47
r-21	.Material for repair and rebuilding steam, electric or diesel locomotives for railroad, mining and industrial use. § (7-21-41)	PD-65).	A-3	P-33F	arm machinery and quipment (8-20-41). evoked by P-95	(PD-81		P-51
	Amendment No. 1 (11-29-41) explains reports to be filed. Interpretation No. 2	1 D-00-a)		ha	laterial for armored alf track vehicles (12-41)	PD-81	A-1-f	P-52
	(2-3-42) limits use of ratings to material physically incorporated into locomotives.			41	faterial for production for radiosondes (8-26-1)	{ PD-6 } PD-6-a } .	A-1-6	
P-22	Repairs (9-9-41). Superseded by P-100			18	3-42) extends cover- ge to indirect needs.			
P-23	.Materials for mining machinery (7-29-41). Superseded by P-56-a	.PD-117	A-3	o: w	laterial for production f arc and resistance elding machines (9-			
P-24	.Material for experimental research work (8-5-41)	PD-74 \ PD-74-a \ .	A-1-b	to	sers of P-39 advised make use of P-90 3-9-42).	PD-81	A-1-c	P-54
P-25-a.	.Parts, accessories and equipment for light tanks (8-11-41)	.PD-81	A-1-f	P-40M	Iaterial for industrial ft trucks (10-14-41)	PD-81	A-1-g	
P-25-b.	Light tanks, spare parts and accessories (8-11-41)	.PD-81	A-1-f	30	mendment No. 1 (12- 0-41). Extends order o repair parts		A-1-g	
P-25-c.	.30 cal. and 37 mm. guns for light tanks (8-11-41)	.PD-81	A-1-f	n	onstruction, mainte- ance, operation of fa- ilities of Pan Ameri-			P-55
*As as	signed on merits of each case.				an Airways, Inc. (8-8-41)	PD-6	A-1-a	*As as

ting signed	Order Number	Material Covered	Related Form	Rating Assigned	Order Number	Material Covered	Related Form	Rating Assigned
l-f	P-42	Material for production of canning machinery, equipment (8-21-41)	PD-88 } PD-93	A-3		provide for use of Production Requirements Plan (P-90) by manufacturers supplying building material. Amended (3-3-42) sim-		
l-f	p.42-a	Machinery and equipment of American Can Co. (9-12-41)	PD-6)	.A-7		plifies extension of rat- ings. Repairs for mines. Re-		
l-d		Amendment No. 1 (9-) 30-41).	PD-6-a §			vokes P-22 as provisions apply to mines (9-22-41)	.PD-119	A-1-a **
l-d		Research laboratory supplies and equipment (8-28-41)	PD-88 }	. A-2		Amended (12-2-41) to cover all mining facilities		to A-8
l-d		of order for construc- tion or expansion.				31-41) covers safety and defense equipment Amendment (3-3-42)		A-3
l-d	P-45	Material for fire-fighting apparatus (10-31-41)			P-56-a	revises ratings. Material for mining machinery (12-31-41). Supersedes P-23	{ PD-25-a } { PD-81 }	A-3
l-d		motorized apparatus Equipment, tools and		. A-2		Amendment (3-3-42) revises ratings.		
10	P-46	supplies used by U. S. Forest Service (11-22-41)	.PD-81	. A-8		Replacement parts for passenger cars, light trucks (9-18-41) Amendment No. 1 (1-23-42 and 2-12-42). Redefines "replacement parts." See L-4.		*
l-b		tories. Amendment No. 2 (10-25-41). Defines minor repairs. Amendment No. 3 (12-	PD-193-a, b, c PD-194-a, b, c PD-195-a, b, c	A-10	P-58	Supplies for specified South American mines (10-8-41)		A-3
	P-47	11-41). Prohibits certain expansions. Maintenance, repair of air transport facilities	DD 04			Scrap for certain copper ingot makers, remelters (10-13-41). Revoked by M-9-b	PD-126	A-10
.0		(9-6-41)	.PD-96	. A-3	P-62	Material for laboratory equipment and reagent chemicals (11-15-41)	(PD-82)	A-5
	P-51	Machinery and equipment for Food Machinery Corp. (9-22-41) Amendment No. 1 (11-	PD-6 } · · · ·	.A-3		Material for producing marine paints (12-5-41)	{ PD-81-a } PD-82	A-3
L-f	1	Material for aircraft accessories (9-15-41).	PD-81 }	.*	P-68	Maintenance and repair supplies for steel in- dustry (10-31-41) Amendment No. 1 (1- 8-42). Order extended	(PD-81)	A-1-a to A-3
	P-53	Textile machinery repairs and maintenance (9-13-41)	PD-81 }	.A-10		to cover Canadian mills operating in U. S Amendment No. 2 (2-27-42) assigns rating for office equipment	(PD-228) (PD-81)	
1-c		Amendment No. 2 (2-28-42) covers repairs; raises rating to A-8		A-8	P-71	.Material for privately financed dwellings for which foundations were) A 10
	P-54	Material for specified types of trucks, pas- senger carriers, trailers (9-12-41)		A-3	P-72	in place 10-9-41 (12-23-41)	PD-135	5
1-g		Amendment No. 1 (12-31-41). Amendment No. 2 (1-23-42) clarifies order,				Amendment (1-22-42) Extends order to Pa American countries	n n	
1-g	*As as	subject to restrictions in I1-a. Defense housing projects (9-12-41)	PD-105-b \	•	P-73	Repairs, maintenance operating supplies for smelters and refiners of copper, lead, zinc, antimony, mercury and cobalt (12-22-41)		
1-a	Eme	rgency repairs only.			1			(A-3

Order Number P-106...

P-107..

P-108. .

P-109..

P-109-a

P-115.

P-120.

P-122.

Order Number M-1..

M-1-a

M-1-c

M-1-d

M-1-f

Order Number Material Covered	Related Form	Rating Assigned	Order Number		Related Form	Rating Assigned
P-74 Material for heat treat ing furnaces (11-22-41 Interpretation No. 1 (1 1-42) extends coverag)PD-81 e	. А-1-с		tion Requirements Plan for businesses with an- nual sales volume of less than \$100,000 Amendment (3-10-42)	PD-25-x	
to material for repair parts.				permits use of ratings assigned by other cer-		
P-75 Material for tackl blocks (10-24-41)	PD-82	. A-1-c		tificates.		
P-76Sheet steel for drum (11-17-41) Amendment (12-31-42 extends use of rating to all types of sheets. So	PD-154-a PD-155-a PD-156-a	A-4		Material for elevators, escalators and dumb-waiters (12-30-41)		A-2
M-45.				Steel plate and elec- trodes for welders'		
P-77Material for rebuildin machine tools (11-1)	0- (PD-81a)	. A-1-c		training classes (1-17-42)	PD-183	*
n	(PD-179)		P-95	.Material for farm machinery and parts (12-27-41). Supersedes P-32,		
P-78Material for conveyir machinery (11-10-41 Expired 1-31-42. Pr).			P-33. See L-26		A-3
ducers advised (2-3-4) to apply under Produ tion Requirements Pla	e- (PD-81)	. A-3	P-98	.Material for petroleum industry (1-14-42). Does not apply to plants operating under		
P-79Hardware for coope age and wooden co tainer industry (11-1	n- 4-			P-43 or P-100 Interpretation No. 1 (2-27-42) limits order		{ A-1-a to A-10
41)	to (PD-81)	A-5 or A-8		U. S. and possessions. Amendment No. 1 (2-		
include paper containers; rating for wing raised to A-7	n- re	(A-5 or) A-7		20-42) permits use of A-8 or lower without countersignature for supplies of less than	t	
P-82Material for production made by blind (11-24)	9- (PD-81)	A-8		\$500. Amended (3-15-42) to cover office supplies		
P-83Material stocked by p troleum industry su pliers (12-8-41)	p- (PD-82)	A-8		and certain automotive equipment; other re- visions		A-10
P-84Material for plumbi and heating repairs (13-42)	3-	A-10	P-98-a.	Extends rating assigned by P-98 to firms out side U. S. (1-21-42).		
P-85Material for resistar welding electrodes (1 3-41)	12- { PD-81 } { PD-81-a }	A-1-c	P-100.	Repairs, maintenance and supplies (12-18-41) Supersedes P-22. Se)	
P-86Material for industrexplosives (12-12-41)		A-8		P. 46, P-56, P-68 Amendment (2-10-42) extends coverage to	0	A-10
P-87Material for insectides, germicides, for gicides (12-13-41).	eti- un- { PD-81 { PD-81-a }	A-10		farm machinery and specified Canadian pro- ducers. Interpretation No.	1	
P-88Material for railremaintenance, repand operation (3-42)	air	(A-1-, A-3		(2-13-42) restricts us of rating for certain critical materials in highway maintenance.	n n	
P-89Maintenance, rep		and A-8		Amendment No. 2 (3 9-42) extends order t	0	
and operating suppl for chemical indus (1-23-42)	lies trv	(A-1-a		refrigeration equipment in stores an restaurants.		
P-90Production Requiments plan (effective first quarter, 1942).	re- tive Su-		P-101.	Material for making stitching and boo binding wire (1-3-42)	g k (PD-81) (PD-82)	A-8
persedes P-6 Amended (1-30-42) permit extension of ratings without spec	to f, g AA cial	е, *	P-103.	Material for specific British refinery		
permission of WPB Amendment No. 1 28-42) Modified Prod	(1-		P-103-	a. Material for specific refinery is sued t Standard Oil Co. (2-5	0	
*As assigned on merits of each appl	lication.			42)		

Order Number Material Covered p.106Material for repair, maintenan e and opera- tion of mills that roll, draw or extrude copper and copper alloys	Related Form	Rating Assigned	Order Number Subject M-1-gAllocates aluminum paint and pig- ment (3-10-42)	
p.107Replacement parts for medium and heavy trucks, truck trailers		A-3	M-2-aSupplement (3-24-41). Superseded by M-2-bSupplement — extends control over scrap, dead stock, etc. (11-14-41). Supersedes M-2, M-2-a	PD-26-m PD-40-m PD-173 PD-184
p.108Material for production of fire protective equipment (2-26-42) { p.109Material for production of aircraft parts (2-20-42). Supersedes P-3, P-4, P-9-a to P-9-y, P-13, P-15, P-52	PD-82 ((A-7	M-3Tungsten (3-26-41). Revoked by M-29 M-3-aSupplement (3-26-41), preference rating schedule. Revoked by M-29 M-4Neoprene (3-28-41). M-4 expired 6-30-41; included under pro-	PD-9
Amendment (3-11-42) abolishes distinction between material physically incorporated into product and other necessary material.			wisions of M-13	
P-109-a. Material for trainer type aircraft (3-11-42) P-115 Material for repairs and expansion of food canning plants (2-11-			M-5-a Supplement (4-10-41)	PD-27
P-120Repairs, maintenance and operating supplies for aluminum and mag- nesium producers and basic fabricators (3-20- 42)	PD-285)) A-3	M-6-a. Primary nickel (9-30-41). Supersedes (M-6). M-6-b. Curtails use of nickel; sets controls over scrap, secondary metal (1-20-42).	PD-27 PD-31
P-122Material for military and naval aircraft not covered by P-109 (3- 11-42)		(A-1-a) A-1-b	M-7Borax and boric acid (6-9-41). M-7 expired 8-30-41	PD-28 PD-29 PD-51
Order	ders	Related Form	M-8-aCork end products (10-1-41) Interpretation No. 1 (10-16-41) covering insulation board. M-9Copper (5-29-41). Superseded by	.PD-196
Number Subject M-1Aluminum (3-22-41). Sup M-1-fSupplement—schedule of 11-41). Superseded by M-1-b Supplement, modifies M-1 with respect to low g eries (4-11-41). Supe M-1-c	ratings (3- M-1-f and M-1-a rade deliv- erseded by	rorm	M-9-a. Establishes full priority control over copper (8-2-41). (Revised 1-7-42). Interpretation No. 1 (2-19-42) covers warehouse deliveries and certain completed products. Supersedes M-9. M-9-b. Copper scrap and copper base alloy	PD-12 PD-37 PD-59 PD-60 PD-60-a
M-1-cSupplement—directs distr scrap and secondary (6-10-41). Revoked by M-1-dSegregation of aluminum	aluminum $M-1-d$		scrap (10-1-41)	.PD-130
content and form ma tory, beginning 3-1-4: Revokes M-1-c and P- M-1-eProhibits aluminum use war work and certa	2 (1-7-42). -12 except on ain specific		M-9-cCurtails use of copper in certain fitems (10-21-41). Amended (11-141). Amended (1-3-42). Exempts health supplies from restrictions.	PD-169 PD-172
items (1-23-42) M-1-fAll aluminum allocation centered in this order, administration (2-17-4 sedes M-1, M-1-a	n controls to simplify 12). Super-	PD-8 PD-26-a PD-97 PD-114 PD-39 PD-40	Interpretation No. 1 (12-26-41) covering radio industry. M-9-c-1 (1-23-42) restricts brass use in shoe making	PD-260

Order Number	Subject	Related Form	Order Number	Subject	Related Form	Order Number
M-10Polyvin	yl chloride (6-9-41)	PD-7 PD-33 PD-36	M-18Chromi Revoked	um (7-7-41)	PD-53-b PD-54 PD-55	M-24 S
Amenda cific M-11-a.July zin M-11-b.Aug. zi M-11-c.Sept. zin M-11-d.Oct. zin	ets up reserve pool (7-1-41). ment (10-16-41) gives spe- shipping instructions. ne pool (7-1-41) ne pool (8-1-41) ne pool (9-1-41) ne pool (10-1-41) ne pool (11-1-41)	{ PD-20 PD-50-a PD-62 PD-94	miun conte Amendi hibit of fe pern Amend hibit	s priority controls on chro- n, limits chromium oxide ent of chemicals (11-29-41). ment No. 1 (1-13-42). Pro- s melting more than 2 tons errochrome monthly without hission. ment No. 2 (2-4-42) pro- s melting without specific permission. Revokes M-18.	PD-53-a PD-53-b	M-25l
M-11-f. Dec. zir M-11-g. Jan. zir M-11-h. Feb. zir M-11-i. Mar. zir	nc pool (12-1-41) nc pool (1-1-42) nc pool (2-1-42) nc pool (3-1-42) ttic rubber (includes Neo-	(PD-7	M-19Chlorin Amend lishe Amend	e (7-26-41)	PD-158-b-c PD-159-a-b-c	M-27
pren Amend tabl	me) $(6-9-41)$	PD-36	Amend	restrictions; assigns specific ngs. ment No. 1 (3-9-42) post- es effective date to April 1.		M-28
M-14Tungst	ten high speed steel (6-11-	PD-101		n-silicon (7-29-41). Revoked M-20-a.		M-29
ther	lment No. 1 (11-29-41) fur- restricts use. lment No. 2 (12-31-41) cov- class A and B steels.		lishe	n-silicon allocation estab- ed (11-29-41). Supersedes	PD-72	M-29-a .
	r conservation (6-20-41) ment (6-27-41). July limita-		M-21Steel	(8-9-41)	PD-73 PD-75 PD-99	М-29-b.
Amend (8-8	s. Amendment (8-4-41). lment — white sidewall tires 3-41). Amendment (11-12-41).		Amend liver filed	ment (9-9-41) prohibits de- ry unless PD-73 has been	PD-100 PD-169	
new Amend	r limitation order covering tires (12-11-41). dment No. 1 (12-19-41) ex- ds ban, except for A-3 orders		fies M-21-a. Supple	PD-73 filing procedure. ment—relating to alloy iron, y steel and wrought iron (9-		M-30
Amend fire Amend ther M-15-t for Amend mittain Amend list Amend	nigher. Idment No. 2 (12-27-41), re: hose. Idment No. 3 (1-20-42) fur- restricts use. Idment No. 3 (1-20-42) fur- restricts use. Idment No. 4 (2-19-42) per- suse in certain products. Idment No. 4 (2-19-42) per- suse of scrap rubber for cer- i items. Idment No. 5 (3-1-42) revises of prohibited products. Idment No. 6 sets stricter trols on sale and use of scrap		rest sale thar Amend hibi stee men A-1 5-b, M-21-b. Supple	1). Iment No. 1 (11-25-41). Sets rictions on production and of steel and iron with more a 3 per cent Cr. Iment No. 2 (12-20-41). Prots melting alloy iron and containing specified elects except for orders rated or higher. M-5, M-5-a, M-revoked by M-21-a. Iment—relating to steel wareses (9-3-41)	PD-83-a to	М-31
and	reclaimed rubber (3-20-42). ets transactions in rubber		war 41).	ehouse requirements (9-26-) (I D-00-1	M-32
tire Amen lish tire	os, casing and tubes	PD-216	Amend vise qua Amend	lment No. 1 (10-14-41), lment No. 2 (1-1-42). Re- s method of establishing rterly quotas. lment (2-28-42) prohibits ac-		M-33 M-34
Amen	tain purchases. dment No. 3 (1-20-42) covers		of	tance of deliveries in excess		M-35.,
Amen tire Amen fies Amen	e to foreign governments. dment No. 4 (1-15-42) covers es for 10-year old trucks. dment No. 5 (1-21-42) clari- restrictions. dment No. 6 (2-13-42) covers bags used by retreaders and		M-21-d. Supple ship resi mor	ment (12-27-41). Restricts oments of corrosion or hear stant alloy iron or steel with the than 4 per cent Cr	PD-298 PD-299	М-36
Amen tra	appers. dment No. 7 (2-16-42) covers nsfer of tires.	3	red	uces tin use; incorporates rections of orders M-38, M-43-33-42).		М-38.
fro to	ts certain transfers of tires m one vehicle to another, or a warehouse (2-16-42).	•	(2-)	tes shot and bullet core stee 17-42)	PD-307	M-38-4 M-38-1 M-38-4
M-16Tricre (8-	esyl and triphenyl phosphates 30-41).		M-23Vanad <i>M-2</i>	ium (8-14-41). Revoked by	y	M-38-
Amen	on (8-1-41)dment revises date of filing of onthly reports (10-14-41).	PD-69 PD-70 f PD-71-a-b-c	ore	llocations for vanadium, inc s, concentrates, ferro-alloys toxide, scrap, etc. (12-20-41) pokes M-23	3,	M-38- M-38- M-39

lated orm	Order	Related Form	Order Subject Relate	
-h	Number Subject M-24Scrap iron and steel (10-11-41)	PD-149	M-39-a.Cobalt supplement (12-5-41). Waives certain forms.	
3	M-25Formaldehyde, paraformaldehyde, hexamethylene-tetramine and	1 D-101	M-39-b. Restricts cobalt use in certain items (2-7-42).	
-a -b	synthetic resins (8-23-41). Amendment (8-28-41) clarifies rat-		M-40Sperm Oil (8-16-41)PD-185	
	ings on resins. Amendment No. 2 (10-1-41). Amendment No. 3 (11-17-41) covers radio tube bases.		M-41Chlorinated solvents, including carbon tetrachloride, trichlorethylene, perchlorethylene and ethylene dichloride (10-15-41)PD-127	
58-b-c 59-a-b-c	Amendment No. 4 (11-17-41) clarifies ratings on synthetic resins. Amendment No. 5 (12-31-41) covers flashlights. M-27Phenols (8-30-41) Amendment (11-10-41)	.PD-162	M-43Tin; control established over supplies, inc., afloats and imports. Purchases of less than 5 tons exempted (12-17-41)	
	M-28Chlorinated hydrocarbon refriger- ants (8-22-41)	PD-162 PD-163 PD-164	M-43-a. Restricts use of tin (12-31-41)PD-229 Amendment No. 1 (2-14-42) freezes stocks of tin and tin bearing material in jewelers' hands.	
2	M.29-a.Supplement (10-13-41); exempts purchasers of 100 lb. or less of tungsten monthly from reporting		Amended (3-17-42) to further restrict use in such items as solder, jewelry, tin plate, etc.	
3	requirements	PD-9	M-44Titanium dioxide use as pigment restricted; pool established (1-1-42)	
00 59	material for rubber, linoleum, paper, etc., after 5-1-42. Other restrictions set up (2-14-42).		42)	
A	M-30Ethyl alcohol and related com- pounds (8-28-41). Amendment (11-12-41).		regulations. Amendment No. 3 (1-24-42). Producers' pool increased 5 per cent.	
1	Amendment No. 2 (1-7-42). Further restricts use and encourages substitution of corn or grain for molasses in production. Amended (1-22-42) further tightens control.		M-45Sheet steel inventory for export drums. See P-76	
3	M-31Methyl alcohol (8-28-41). Amendment (11-12-41) concerning residual supply. Amended (12-19-41). Relaxes cer-		ported in such containers. M-46Chlorinated rubber (11-1-41) (PD-143 Amendment No. 1 (2-23-42) freezes (PD-144 stocks; exceptions listed.	
3-a to 3-f	tain restrictions. Amendment No. 2 (12-31-41). Prohibits use as an anti-freeze agent; assigns B-8 rating for certain uses.		M-47Burlap placed under full allocation, inc. imports (12-22-41). See or- der for effective date on import (PD-186 shipments	
3	M-32Potassium perchlorate (8-28-41). M-33Potassium permanganate (8-28-41). M-34Toluene (8-28-41) Amendment No. 1 (12-30-41) establishes full allocation beginning Feb. 1, 1942.	(PD-223) PD-224	vides for disposition. Amendment No. 2 (1-19-42). Permits certain users to process small amounts. Amendment No. 3 (2-16-42) covers certain agricultural uses of burlaps bags.	
69-a 98	M-35Phosphorus oxychloride (8-30-41). M-36Manila fiber and manila cordage (8-	(PD-128	M-49Iridium use in jewelry curtailed (12-12-41).	
99	29-41) Amendment (8-14-31). Amendment No. 2 (12-19-41) sets further instructions on cordage sales.	PD-129	M-50Restricts use of jewel bearings and materials (1-14-42) PD-236 Amendment No. 1 (2-28-42) establishes additional restrictions.	
21	Amendment No. 3 (2-20-42) further restricts processing and sales.	(DD 44	M-51Hog bristles more than 3 in. long reserved for military use (12-13-	
01 07	M-38Lead allocation established, poo provided (10-4-41)	PD-66-a PD-124	Amendment No. 1 (2-4-42) further restricts use.	
07 08	N-38-c. Curtails use of lead in specified	i	M-51-a. Supplement (1-7-42). Authorizes national inventory of bristlesPD-21	7
	M-38-d.Jan. lead pool (1-1-41). M-38-e.Feb. lead pool (2-1-42). M-38-f.Mar. lead pool (3-1-42).		M-52Sulphite pulp allocation order; pool provided (1-9-42)PD-19 Amendment No. 1 (1-22-42) concerning Rayonier, Inc.	8
4	M-39Cobalt (11-4-41) Allocation established (2-7-42).	PD-152	Amendment No. 2 (2-5-42) supplementary order.	

Order Number	Subject	Related Form	Order Number	Subject	Relate Form
Amen	dment No. 3 (2-1-42) revises b. allocations; lists Lend-Lease eds.		tiller	ment (2-20-42) prohibits dis- ries from producing spirits beverages.	
M-54Molas	ses consumption restricted;		M-70Restrict 27-42	ts use of Jute from India (2-	PD-318
its Amen	making (1-7-42). ded (1-23-42) restricts use in imal feed; alters reporting pe-			delivery of tin and lead scrap	PD-262
rio Interj	ds. pretation (2-2-42) concerning erto Rico and Virgin Islands.			es diphenylamine	
M-57Tung	oil (1-8-42).			shes land turbine production dules (3-9-42).	(DD 941 a
cer			M-78Curtail	s use of mercury (1-23-42)	PD-241, 2 PD-243, 2 PD-245, 2
(3		.PD-355	Afri	s use of asbestos from South ca (1-20-42)	PD-252
ac	ricts use of oils with high lauric id content (3-20-42)	.PD-354	use	ment No. 1 (2-28-42) covers of high temperature pipe rings.	
M-62Full	allocation control placed on dium nitrate (1-13-42).	PD-303-a PD-303-b	tin d Telegra susp Telegra pern	s use and manufacture of cans (2-11-42)	PD-269
an	blishes control over imports of timony, cadmium, chromium, pper, graphite, plumbago, ky-			eed distribution controls (1-	
tur cor Amer	ite, lead, quicksilver, rutile, ngsten, vanadium, zin;, zir-nium (12-28-41). Graphire, umbago, removed from list;	PD-227-a PD-222-b	Telegra	fibre distribution controlled 0-42). aphic amendment (2-23-42) ses Feb. schedule.	
lea Amer lov lis raj tur	nd added. ndment No. 2 (1-13-42). Fol- wing material add to control t: Hides and skins, asbestos, peseed oil, cocoanut, palm and ng oil and copra.		42). Amenda dead	distribution controls (2-4- ment No. 1 (3-16-42) revises line for dealers' sales and fines certain war require- ts.	
mo	ndment No. 3 (3-14-42) re- oves certain restrictions on dmium, zinc, lead ores.		quar	canners to set aside certain ntities for war use (3-14-42).	
	nium placed under full priority ntrol (1-17-42).		to b	nces quantities of 1942 pack of set aside for war use (3- 2)	
ite	uils use of cadmium in certain ems (1-17-42).				
pr	ew nut oil placed under full iority control (1-13-42).		M-95Prohibi	its rhodium use in jewelry 1-42)	PD-295
ele	liers of plumbing, heating, ectrical supplies (wholesale ad retail) placed under Produc-	(DD 4		distribution of agar (2-9-) PD-296
M-68Rest	on Requirements Plan (1-3-42) ricts use of materials for	(PD-1-x) PD-25-a	M-97Removence	es inventory restrictions to ourage stocking of coal and e (2-13-42).	
Amer	uilding new oil and natural gas ells (12-23-41)	PD-214-b	M-100Ration	ing order covering light, ium, heavy trucks, truck- lers and trailers.	
Amer to M-68 sp Ame	s of drilling on 12-23-41. Indment No. 2 (1-28-42) refers wells spudded before 12-23-41. Indicated areas. Indicated areas. Indment No. 3 (2-18-42) covers well spacing.		clud 50 1 repo	o molybdenum allocation, ining scrap. Users of less than lb. monthly exempted from orting requirements. (3-18-	PD-358
	reign countries. covering				
tio 14 Inter	ibits construction of new facili- es, including filling stations (1- 1-42)	.PD-215	Order	"L" Orders	
	illed heverence making		Number	Subject	

L-1.....Restricts production of motor truck and public passenger carriers (8-30-41). Related form, PD-95.

Amended by L-1-2.

M-69...Distilled beverages, making curtailed (1-10-42).

Supplement No. 1 (1-16-42) supersedes paragraph C.

Order	Cubicat	Order
Number	Subject	Number
	Restricts production of medium motor	
	trucks, truck trailers, passenger carriers and replacement parts (9-12-41). Amends	
	L-1.	
	Amendment No. 1 (12-4-41) removes re-	
	strictions on truck trailers.	L-5-c
	Amendment No. 2 (12-31-41) February quotas.	
	Amendment No. 3 (3-1-42) aimed at	L-6
	boosting output of medium heavy trucks.	_
	Amendment No. 4 (3-2-42) halts pro-	L-6-a
-1-c	duction of medium trucks. Prohibits sales of medium and heavy	
,	trucks except for defense use (1-8-42).	
	Amendment No. 1 (1-8-42) modifies sales	L-6-b
	ban.	1.0
	Amendment No. 2 (1-14-42) extends ban. Amendment No. 3 (1-20-42) permits	L-6-c
	transfers and repossessions.	L-7
	Amended (2-25-42) covering fire ap-	12-4
1.4	paratus. Explains forms to be used by persons	
,-1-u	handling motor carriers (2-14-42).	L-7-a
-2	Restricts production of passenger auto-	
	mobiles (9-13-41).	L-8
	Interpretation No. 1 (12-23-41) exempts	
	units made for specified defense agencies from quotas.	L-11
L-2-a	Supplement (10-24-41). December quotas.	L-13
	Amended (2-21-42) respecting March	D-10
1 9 1	quotas.	
L-2-D	Restricts use of bright work on automobiles after Dec. 15 (10-27-41).	
	Amendment No. 1 (12-10-41) extends ef-	L-15
	fective date of L-2-b to Dec. 31, 1941;	L-10
	exempts certain parts.	L-16
	Supplement (11-7-41). January quotas. Supplement (12-10-41). February quotas.	
L-2-e	Revision of production schedules for De-	L-18
	cember and January; limits number of	L-10
	tires per car (12-24-41).	L-18-a.
	Amendment No. 1 (1-23-42) revised quotas.	
L-2-f	Restricts sales of passenger automobiles	L-20
	(1-1-42).	
	Amendment No. 1 (1-8-42) permits cer-	
	tain sales. Amendment No. 2 (1-14-42) changes ex-	1 01
	piration date of ban.	L-21
	Amendment No. 3 (1-20-42) permits cer-	
1.9.6	tain transfers and repossessions.	
L-2-II	Permits completion of specified ambulance chassis (1-31-42).	L-21-a.
L-2-i	Permits sale of auto plant steel invento-	
	ries under specified conditions (3-9-42).	L-23
L-3-f	Prohibits production of light trucks (2-1-	
	42).	
L-4	. Restricts production of replacement parts	
	used in repair of passenger automobiles and light trucks (9-19-41).	L-25
	Interpretation No. 1 (12-23-41) exempts	
	from quotas units made for specified de-	L-26
	fense agencies.	L-26-a
	Amendment No. 1 (11-22-41) establishes optional base period.	17-20-8
	Amendment No. 2 (1-23-42) defines re-	
	placement parts.	L-27
L-4-a	January, 1942, production schedule for	L-27-a
	light trucks for civilian use (11-14-41).	L-21-a
	Amendment No. 1 (1-23-42) increases output 150 per cent.	L-28
L-5	Restricts domestic mechanical refriger-	E 04
	ator production (9-30-41). Related form,	L-31
	PD-125.	L-32
L-5-a	.Excludes from quotas refrigerators made	
	for specified war uses.	L-35
	January, February quotas (1-6-42). Amendment (1-6-42) permits certain	
	sales.	
	Superseded by L-5-c.	L-37

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Order	4.4
Number	Subject
	Interpretation No. 1 (2-16-42) clarifies
	deadline on sales. Amendment (3-2-42) permits sales, with-
	out WPB permission, to government agen-
	cies.
	Prohibits refrigerator production after
	4-30-42. Supersedes L-5-a
L-6	Supersedes L-5-a. Restricts production of laundry equipment
	(10-29-41)
	Extends original curtailment period on
	laundry equipment to Jan. 31, 1942; sets further restrictions on February, 1942,
	production (19.19.41)
L-6-b	Extends February laundry equipment
	quotas into March (2-24-42). Stops laundry equipment production April
L-6-c	Stops laundry equipment production April
1 7	15 and May 15 (3-14-42). Restricts production of non-mechanical
L-1	ice refrigerators (10-29-41) Related
	ice refrigerators (10-29-41). Related forms, PD-176, PD-177.
L-7-a	Excludes from quotas refrigerators made
	for specified war uses; increases rate of curtailment (1-6-42).
T 0	Restricts distribution of motor fuel in At-
	tlantic Coast area. Revoked Oct. 24.
L-11	. Restricts use of chlorine in pulp, paper
	and paperboard making (11-15-41).
L-13	Restricts production of metal office furni-
	ture and equipment (11-7-41). Related forms, PD-134 and PD-136.
	Amendment No. 1 (12-31-41) establishes
	additional restrictions.
L-15	.Restricts use of waste paper in eastern
I 16	mills (10-25-41). Revoked Jan. 5, 1942. Restricts electric power use in southeast-
L-10	ern area (10-30-41). Revoked, effective
	1-5-42.
L-18	Restricts output of domestic vacuum
T 10 a	cleaners (1-1-42). Supplement (1-1-42). Establishes quotas
L-10-a	for 1st quarter, 1942.
L-20	for 1st quarter, 1942. Restricts use of cellophane and similar
	materials derived from cellulose (11-8-
	41). Amendment No. 1 (1-10-42) enlarges list
	of restrictions.
L-21	. Restricts production of automatic phono-
	graphs, weighing, amusement and gaming
	machines (12-10-41). Related form, PD-182.
L-21-a	Orders cessation of all automatic phono-
	graph, weighing and amusement machines
* 00	on May 1 (3-16-42).
L-23	Restricts production of domestic cooking appliances (12-13-41). Related forms,
	PD-192-a and PD-203.
	Amendment No. 1 (2-7-42) covers use of
T 0F	bright work.
L-25	Restricts use of tin and lead foil after Mar. 15, 1942 (11-24-41). Revoked 1-15-42.
L-26	Restricts production of farm equipment
	(12-28-41). See P-95.
L-26-a	Prohibits manufacture after May 1 of
	farm tractors requiring rubber tires (3-
L-27	9-42). Restricts production of vending machines
	(10 91 41)
L-27-a	Stops production of certain types of vend-
1 90	ing machines April 30 (3-17-42). Restricts use of scarce metal in incan-
L-48	descent lamps (1-24-42).
L-31	Restricts use of natural gas (2-16-42)
	Related form, PD-283.
L-32	.Restricts use of metal in auto license
135	plates (3-18-42). Restricts output of replacement parts for
LI-00	trucks, busses (1-22-42). See P-107.
	Amendment No. 1 (3-5-42) sets up 1942
1 0-	production program.
L-37	Restricts production of musical instru
	ments (2-17-42).

Order	
Number Subject 2-39Restricts use of scarce material in fire	
protective equipment (2-24-42). -42Establishes Simplification S hedule No. 1,	E-1
specifications for iron, brass and bronze valves (2-11-42).	
Simplification Schedule No. 2 (2-25-42)—cast, malleable iron, brass and bronze pipe	E-1
fittings. Simplification Schedule No. 3 (3-7-42)— low pressure heating boilers. Simplification Schedule No. 4 (3-16-42)—	E-1
cast iron soil pipe and fittings. -43Restricts use of scarce material in motor-	E-2
ized fire apparatus (2-27-42).	E-2
L-44Restricts output of radio and radio-phonographs (1-23-42).	
L-44-aStops production of radio and radio- phonographs for civilian use on April 22 (3-7-42).	E-3
L-46 Establishes procedure for curtailing, when necessary, electric power use in Western New York (2-27-42).	E-4
L-48 Restricts production and sale of aircraft of less than 500 hp.; also limits aluminum use in such craft (2-17-42).	
L-49 Restricts iron and steel use for beds, bed springs and mattresses (3-20-42).	
L-50Restricts certain practices of telephone companies (3-2-42).	No.
L-52Restricts production of bicycles and bicycle parts.	
L-53 Directs sale of track-laying tractors and auxiliary equipment (2-19-42).	No
L-54 Freezes deliveries of new and used type- writers (3-6-42). Amendment No. 1 (3-7-42) covers used machines.	No
L-54-aRestricts production of typewriters (3-17-42).	No
L-54-bLimits sale and rentals of specified types of new office machinery except on ratings of A-9 or higher.	No
L-55Restricts sales of shotguns; sets up production quotas (2-23-42).	No
L-56Restricts delivery of fuel oil in East and Northwest (3-14-42).	No
L-57 Restricts sales and manufacture of gas masks and anti-gas devices (3-3-42).	No
L-58Restricts sales and importations of sextants (3-11-42).	
L-60Freezes sale or other disposition of new pistols, rifles and shotguns (2-27-42).	
L-61Restricts production and distribution of tire recapping and retreading equipment	
(3-11-42). L-62Curtails production of metal household	Ge

furniture; all production to halt May 31

Extends ban on use of bright work on all

types of motor vehicles and trailers (3-

L-70..... Restricts delivery of gasoline in East and

Northwest (3-14-42).

(3-20-42)

14-42)

"E" Orders

E-1.....Machine tool distribution controls established (3-28-41). Supplement No. 1 (7-7-41) lists group classification. Superseded by E-1-a.

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- E-1-a... Revises Master Preference Numerical list. Supersedes E-1. Suspended 1-7-42.
- E-1-a Rev. Contains revised Master Preference Numerical list; gages and chucks included; complete priority control established. (1-15-42). Supersedes E-1-a.
- E-2.....Cutting tools. Amendment (7-25-41). Revoked by E-2-a (7-17-41).
- E-2-a...Controls distribution of cutting tools (8-28-41).

 Revokes E-2.

 Amendment (11-29-41) additional items added to list.
- E-3.....Allocates tools for United Kingdom (1-12-42).
- E-4.....Allocates distribution of second-hand machine tools (2-3-42).

Priority Regulations

- No. 1...Regulations affecting acceptance of priority orders and inventories (8-27-41). Amended (1-23-42) to make mandatory the acceptance of all rated orders; other changes announced.
- No. 2... Makes mandatory the acceptance of all rated orders issued by E. R. Stettinius, Jr. (9-9-41).
- No. 3...Revises procedure for using forms PD-1 to PD-5; authorizes use of new forms PD-1a and PD-3a (1-12-42).
- No. 4... Validates priority certificates issued by Donald M. Nelson (1-26-42).
- No. 5... Explains procedure and restrictions on reproduction of forms (2-5-42).
- No. 6...Abolishes Priorities Critical List, subject to restrictions of individual priority orders (2-11-42).
- No. 7...Permits use of facsimile signature for endorsing and extending orders, subject to specified conditions (2-17-42).
- No. 8... Abolishes certain reporting requirements, largely in connection with producers' monthly reports of extension of ratings (3-17-42).

Miscellaneous Orders

- General Metals Order No. 1. (Terminated September 23, 1941. Restrictions imposed covered by Priorities Regulation No. 1).
- Special Allocation No. 1 Directs certain machine tool builders to accept specified orders for Russia (11-11-41).
- General Allocation Order No. 1—Steel Plates (11-29-41). See M-21-c.

How to Address Priority Reports and Inquiries

• • • If you are required to file a priority report or make an inquiry to WPB, address the envelope as follows: "Director of Industry Operations, New Social Security Bldg., Washington, D. C.—Ref." (insert here the number of the order concerned, as P-68, L-2, M-63, etc.). Using this procedure will speed handling of your letter in Washington. Avoid addressing communications to an individual as much as possible.

L-69.

Relief From "M" and "L" Orders

Principal grounds recognized by the WPB for granting appeals from materials and limitation orders

IF the granting of an amount of scarce material will hasten the firm's conversion to war production, permission may be granted to accelerate its production or scarce material consumption to cover up to 120 per cent of the firm's quota as set by the order for the period required for conversion, if such conversion is to be 80 per cent or more and will proceed without substantial interruptions.

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If conversion will be speeded, a firm may be allowed to produce replacement parts or other articles that will be needed for essential civilian products during any period up to three years after the effective date of the appeal decision, provided conversion to war production is to be 80 per cent or more, and if it is not feasible to have such replacement parts made by other firms

If conversion will be quickened, permission to finish semi-fabricated inventory on hand will be granted if such inventory will be a serious impediment to conversion to war production, or cannot be retained, used or sold for other purposes without serious financial loss, and will require only relatively small amounts of scarce material for its completion and no satisfactory substitutes for such material can be found to manufacture relatively essential end-products.

2 TO hold personnel organization intact; to take over the quota or obligations of another firm which is converting to war production, if WPB approves; to produce or acquire any equipment or supplies which will facilitate the firm's conversion needed to carry out any other action in accord with the foregoing.

3 IF conversion will be facilitated by the granting of an amount of scarce material that will not exceed the amount that will be saved in one year by the conversion, an appeal may be granted if it be shown that simplification or substitution will result in the saving of substantial amounts of scarce materials in the making of an essential civilian product. The same bases for appeal may be set forth which are indicated in Item 1.

A IF a limitation order would impose exceptional or unreasonable hardship upon a firm's production of essential civilian products, it may be shown that at the time of the order's issuance the firm did not exist and, therefore, could not limit its production on the basis of a period when it was not doing business. Or it may be shown that during the base period of the

order, upon which production was to be limited, the firm experienced subnormal operations because of noneconomic reasons such as fire, flood, construction, etc.

Relief may be granted from the terms of a limitation order which restricts certain materials, if a company can show that its production during the base period designated in the order was confined largely to types of product, or involved the use of substantial quantities of raw materials, not covered by the order.

Relief may likewise be given if it be shown that the amount of scarce material the firm requests is either exceptionally small or cannot be replaced by a substitute material without unreasonable expense or expenditure of other materials.

Any other circumstances may be set up to show that the order will cause exceptional and unreasonable hardship to the firm because of undue competitive advantage to other companies making the same product. However, a company must show that its operations during the base period were in reasonable accord with WPB objectives.

5 UNEMPLOYMENT which an order may cause is adequate ground for granting an appeal if the amount of scarce material consumed per man-hour is relatively small, and if the workers involved are not suitable for other employment, or cannot find other jobs within a reasonable time. It may be further shown that the resulting unemployment will cause the loss of skills or crafts that are deemed by WPB too important to be sacrificed.

AN appeal may be granted if it is shown that substantial competitive inequities arose from lack of uniformity in the administration of orders, or incorrect reports connected therewith, or to permit a company to take any action which is in full accord with the intent of an order but was inadvertently prohibited by it.

7 IF the making of certain replacement parts or supplies is deemed to be non-essential to the United States, but proper authorities have said they are desirable for export to create foreign exchange or for other reasons, an exception may be granted.

Also a firm may be permitted to take any other action deemed by proper authorities to be necessary to lend-lease or other economic programs—the acquisition of excess inventory of scarce materials, or the exceeding of production quotas for export purposes.

All War Industries to Use Production Requirements Plan

WPB has announced that over the coming three months, all war industries will be required to use the Production Requirements Plan, priority order P-90, to obtain priority ratings. With this plan, the end use of the product will be the chief determining factor in the rating granted. As present blanket and general priority orders expire, they will not be extended, but the industries covered will be shifted over to PRP. It is important that you familiarize yourself with the expiration date of the orders covering your industry so you will be prepared to use PRP. Watch the feature "This Week's Priorities and Prices" each week in The Iron Age for information on orders which have expired.

Forms to Use With Priority Orders

Forms below are those in use at time of going to press. See column "Related Forms," pages 5 to 14

Form	No.	Description

PD-1.....Obsolete after Feb. 2, 1942. See PD-1-a.

PD-1-a....Application for preference rating in cases where PD-3-a is not applicable. Effective after Feb. 2, 1942. May be reproduced.

PD-1-c....Application for rating to be used only by ship repair yards for inventory needed for ship repairs.

PD-1c-a... Affidavit to accompany application for rating for inventory needed for repairs which are to be used by ship yards, facilities, chandlers and ships in service.

PD-1-x....Application for rating to be used by distributers, jobbers and wholesalers.

PD-3.....Obsolete after Feb. 2, 1942. See PD-3-a.

PD-3-a....Application for preference rating for orders from Army, Navy, Coast Guard, Maritime Commission, Coast and Geodetic Survey, Panama Canal, National Advisory Committee on Aeronautics, Civil Aeronautics Authority, Office of Scientific Research and Development, Surplus Marketing Administration, and contracts or orders from foreign governments. Replaces, after Feb. 2, 1942, former PD-3, PD-4 and PD-5. May NOT be reproduced.

PD-4..... Obsolete after Feb. 2, 1942. See PD-3-a.

PD-5.....Obsolete after Feb. 2, 1942. See PD-3-a.

PD-6......Manufacturers' monthly report of extension of preference rated orders.

PD-6-a . . . Alternate of PD-6.

PD-7.....Producers' monthly report to OPM of synthetic rubber and plasticized resin requirements.

PD-8.....Aluminum priority rating index sent to aluminum suppliers as guide to scheduling deliveries.

PD-9 Rev.. Users' monthly application for allocation of tungsten powder, ferrotungsten or tungsten compounds; re. M-29.

PD-9-a....Report of consumption of tungsten for metallic uses and request for allocation for a given month; re. M-29.

PD-9-b....Report of tungsten consumption for nonmetallic uses and request for allocation for a given month; re. M-29.

PD-9-c....Application for allocation of tungsten for metallic and non-metallic uses for delivery in a given month; re. M-29.

PD-10.....Request for nickel bearing steel, re. M-5.

Obsolete.

PD-11.....Report of inventory of nickel bearing steel; re. M-5.

PD-12.....Report of copper and copper alloy products; re. M-9.

PD-13.....Producers or rated subcontractors monthly report of preference rated orders placed during a month; re. P-3.

Form No. Description

PD-14.....Producers or subcontractors monthly report of preference rated orders placed during a month; re. P-4.

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PD-17....Obsolete.

PD-18.....Manufacturers' monthly report of receipts and shipments of nickel bearing steel.

PD-19-a Obsolete.

PD-20.....User's application for allocation of metals from Metals Reserve Co. Withdrawn,

PD-21 PD-22 | Obsolete.

PD-24.... Priorities Critical List.

PD-25.....First report of requirements of scarce materials; re. Production Requirements Plan.

PD-25-a...Standard form of subsequent report of requirements of scarce materials; re. Production Requirements Plan.

PD-25-b...Manufacturers' report of extensions of Production Requirements Plan.

PD-25-c Obsolete.

PD-25-e...Certificate of analysis of defense supplies business.

PD-25-f...Appeal; re. PRP-order P-90, for higher rating or additional materials than granted on PD-25-a.

PD-25-g...Report of ratings other than assigned on PD-25-a; re. P-90.

PD-25-x...Application under Modified Production Requirements Plan; re. P-90.

PD-26.....Report of proposed aluminum shipments filed monthly with WPB by fabricators, secondary smelters and producers.

PD-26-a...Producer's, secondary smelter's application for authorization to ship aluminum or aluminum products.

PD-26-m...Producers' application for authority to ship magnesium.

PD-27.....Monthly application for allocation of nickel for melting purposes; re. M-6.

PD-28.....Cork supplier's affidavit of compliance with special direction of WPB; re. M-8.

PD-29.....Supplier's monthly report of cork inventories, deliveries, production and requirements; re. M-8.

PD-30.....Producer's or rated subcontractor's monthly report on use of priority ratings for shipbuilding material.

PD-30-a... Alternate to PD-30.

PD-31....Obsolete.

Form No.	Description
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- pp-33.....Synthetic rubber producer's monthly report of stocks, production and orders; re. M-13.
- PD-34.... Steel producer's report concerning failure to meet customer's delivery requirements.
- pp-35.....Steel producer's report concerning refusal to accept customer's order.
- PD-36.....Fabricator's monthly report on stocks, use and requirements of synthetic rubber and plasticized resin; re. M-13.
- PD-37.....Monthly report of production of dutyfree refined copper.
- PD-38.....Producer's or subcontractor's monthly report of extension of preference rated orders for freight car material; re. P-8.
- PD-38-a...Alternate to PD-38.

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- PD-39.....Aluminum producer's monthly report of shipments (an informal questionnaire).
- PD-40-a...Aluminum buyer's quarterly report of inventories and consumption.
- PD-41.....Monthly report of extension of preference rated orders for material for ship conversion; re. P-10.
- PD-41-a...Alternate to PD-41.
- PD-42.....Producer's or subcontractor's monthly report of extension of preference ratings for materials for metal working equipment; re. P-11.
- PD-42-a...Alternate to PD-42.
- PD-43.....Producer's or subcontractor's monthly report of extension of preference ratings for material for bombers.
- PD-43-a...Alternate of PD-43.
- PD-44.....Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers.
- PD-44-a...Alternate to PD-44.
- PD-45.....Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers.
- PD-45-a...Alternate to PD-45.
- PD-46.....Producer's or subcontractor's monthly report of extensions of preference ratings for material for bombers.
- PD-46-a...Alternate to PD-46.
- PD-47.....Producer's or subcontractor's monthly report of extensions of preferences ratings for material for bombers.
- PR-47-a...Alternate to PD-47.
- PD-48.....Producer's or subcontractor's monthly report of extensions of preference ratings for materials for bombers.
- PD-48-a...Alternate to PD-48.
- PD-49.....Processor's monthly report of stocks, consumption and receipts of crude rubber; re. M-15.
- PD-49-a...Importer's and dealer's monthly report on crude rubber; re. M-15.
- PD-50.....Customer's sworn statement to accompany each order for zinc; re. M-11.
- PD-50-a...Producer's monthly statement of compliance with zinc order M-11.
- PD-51..... Monthly cork allocation; re. M-8.

Form No. Description

- PD-52.....Producer's or subcontractor's monthly report of extensions of preference ratings for materials for Curtiss-Wright airframes.
- PD-52-a...Alternate to PD-52.
- PD-53-a Rev. Monthly application for chromium for melting (schedule 1); re. M-18.
- PD-53-b Rev. User's monthly report of chromium stocks and consumption; re. M-18.
- PD-54 Rev.. User's monthly request for chromium chemicals; re. M-18.
- PD-55.... User's request for refractories containing chromium (one copy to producer, two to WPB).
- PD-56.....Producer's or subcontractor's monthly report of extension of preference ratings for materials for shipway construction; re. P-14-a and P-14-b.
- PD-56-a...Alternate to PD-56.
- PD-57.....Producer's or subcontractor's monthly report of extensions of preference ratings for materials for electrical relays and solenoids; re. P-15.
- PD-57-a...Alternate to PD-57.
- PD-58.....Producer's or subcontractor's monthly report of extension of preference ratings for materials for radio equipment; re. P-16.
- PD-58-a...Certification covering PD-58.
- PD-59.....Monthly application of supplier or consumer for allocation of copper for domestic consumption. See PD-59-a; re. M-9-a.
- PD-59-a...Supplementary statement to be filed with copper application. Replaces PD-59.
- PD-60....Obsolete.
- PD-60-a...Obsolete.
- PD-60-b...Fabricator's monthly report of inventory of copper for domestic consumption; re. M-9-a.
- PD-61.....Refiner's monthly report of production and shipments of duty-free refined copper; re. M-9-a.
- PD-62.....Consumer's monthly application for allocation of zinc oxide; re. M-11.
- PD-63.....Builder's or supplier's monthly report of extension of preference ratings for materials for defense projects; re. P-19.
- PD-63-a...Certification to accompany orders furnished by builders or suppliers; re. P-19.
- PD-64.....Producer's or supplier's monthly report of extension of preference ratings for material for locomotives; re. P-20.
- PD-64-a...Certification to accompany purchase orders by supplier or producer.
- PD-65.....Supplier's or repairshop's monthly report of extension of preference ratings for materials for locomotive repair; re. P-21.
- 65-a...Certification to accompany purchase orders by repair shop or supplier.

- Form No. Description
- PD-66.... Report of lead user showing stocks, unfilled orders, consumption and estimated requirements; re. M-38.
- PD-66-a...Consumer's monthly application for allocation of lead; re. M-38.
- PD-67....Obsolete.
- PD-68....Builder's or supplier's monthly report of extension of preference ratings for material for construction of defense projects; re. P-19-a.
- PD-68-a... Certification to PD-68.
- PD-69.....Consumer's monthly order for pig iron (to be sent to producer); re. M-17.
- PD-70.....Consumer's monthly report of inventory and consumption of pig iron (file with WPB); re. M-17.
- PD-71.....Pig iron producer's proposed monthly shipping schedule; re. M-17.
- PD-71-a...Order setting pig iron reserve pool (sent to producer by WPB); re. M-17.
- PD-71-b...WPB monthly authorization to pig iron producer to make shipments; re. M-17.
- PD-71-c...WPB authorization (allocation) to pig iron producer to ship to an individual user; re. M-17.
- PD-72.....Consumer's monthly application for allocation of calcium-silicon; re. M-20.
- PD-73.....Customer's statement to steel producer (and WPB) classifying purchase order (must accompany each order); re. M-21.
- PD-74.....Monthly report of extension of preference ratings for material for experimental research work; re. P-24.
- PD-74-a... Alternate to PD-74.
- PD-75.....Consumer's monthly request for alloy iron or steel.
- PD-76.....Copper refiner's monthly allocation report to WPB; re. M-9.
- PD-79.....Producers' report of requirements for health supplies, to accompany each request for rating under P-29.
- PD-81.....Monthly report of extension of preference ratings for material covered by various orders; to be made by person using the rating.
- PD-81-a...Alternate to PD-81.
- PD-82.....Standard form of application for preference rating for deliveries of scarce material for war projects.
- PD-82-a...Application for priority rating by oil industry supply houses; re. P-83.
- PD-83....Monthly steel warehouse report; re.
- PD-83-a...Obsolete.
- PD-83-b...Individual preference rating certificate for steel warehouse requirements; re. M-21-b.
- PD-83-c...Obsolete.
- PD-83-d...Classification instructions for steel warehouse monthly report on PD-83.

- Form No. Description
- PD-83-e...Steel warehouse's request for change in "producers" supplying products with A-9 rating; re. M-21-b.

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- PD-83-f...Steel producer's report to warehouses; re. M-21-b.
- PD-84.....Vanadium report. Superseded by PD-209-a and PD-209-b.
- PD-88.....Standard form of application for preference rating.
- PD-90....Obsolete.
- PD-92.... Cancelled.
- PD-93.....Purchaser's report of preference rated orders placed with supplier of scientific equipment; re. P-43.
- PD-94.....Monthly application for allocation of zinc; re. M-11.
- PD-95....Cancelled.
- PD-96.... Buyer's application for preference rating for scarce materials for maintenance and repair of aircraft and equipment; re. P-47.
- PD-97.....Monthly report of radio parts maker concerning inventory and use of aluminum foil.
- PD-99.....Steel producer's monthly report of allocations, capacities and production schedule; M-21.
- PD-100....Monthly report of steel producer (with more than one plant) on capacity, production and allocations; re. M-21.
- PD-101....Producer's quarterly report of high speed steel orders and shipment; re. M-14.
- PD-105 Rev. Builder's application for preference rating for privately owned defense housing; re. P-55.
- PD-105-b. .Superseded by PD-105 as revised 12-15-41.
- PD-107....Questionnaire to be filed by applicants for preference rating for material for research laboratories; re. P-43.
- PD-108....Questionnnaire to be filed by producer concerning material for aircraft accessories.
- PD-109....Foundryman's report of receipts, purchases and consumption of copper scrap for period Oct. 1 to Nov. 1, 1941; re. P-61.
- PD-114....Application for authorization to enter into toll processing agreement covering aluminum.
- PD-119....Mine operator's monthly report of use of priority ratings for material for mines; re. P-56.
- PD-120.... Monthly report of scrap dealer showing inventory of copper, lead, nickel, tin and zinc scrap.
- PD-121....Monthly report of copper scrap consumer.
- PD-121-a.. Smelter's monthly copper scrap inventory report.
- PD-121-b.. Foundry's monthly report of copper scrap inventory.
- PD-123....Producer's monthly report of requirements of copper and copper alloys for December; re. M-9-a.

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pp-123-a.. Producer's monthly report of require-ments of copper and copper alloys for January; re. M-9-a.

PD-123-b..Monthly report of deliveries of copper and copper alloys; re. M-9-a.

PD-124....Lead producer's proposed monthly shipping schedule; re. M-38.

PD-125.... Manufacturer's monthly report concerning domestic mechanical refrigerators; re. L-5.

PD-126....Dealer's application for A-10 preference rating for deliveries of copper scrap; re.

PD-127....Purchaser's certificate covering chlorinate hydrocarbons to accompany each order; re. M-41.

PD-128....Processor's report covering board fibers and products; re. M-36.

PD-129....Importer's report covering board fibers and products; re. M-36.

PD-130....Melter's or processor's application for preference rating under order M-9-b.

PD-131....Cancelled.

PD-132....Obsolete.

PD133.... Cancelled.

PD-134...Monthly report covering metal office fur-niture and equipment inventories and production and metal inventories, receipts and consumption; re. L-13.

PD-134-b.. Report of production and inventories and steel in finished items of metal office furniture and equipment; re. L-13.

PD-135....Application for priority rating to com-plete privately financed dwellings whose foundations were in place 8-9-41; re.

PD-136.... Application for conversion of weights of metal other than steel to an equivalent weight of steel; re. L-13.

PD-143....Fabricator's monthly report of chlorinated rubber requirements; re. M-46.

PD-144....Fabricator's monthly report of chlo-rinated rubber receipts, consumption, in-ventories and requirements; re. M-46.

PD-145....Application for specific allocation of titanium pigments; re. M-44.

PD-146.... Manufacturer's certificate concerning titanium pigments; re. M-44.

PD-148....Application for preference rating for scarce materials for iron and steel plant operation; re. P-68.

PD-149....Monthly report of iron and steel scrap producer; re. M-24.

PD-150....Monthly report of iron and steel scrap consumer; re. M-24.

PD-151....Monthly report of iron and steel scrap broker or dealer; re. M-24.

PD-152....Monthly application for allocation of co-balt for metallic uses; re. M-39.

PD-153....Monthly application for allocation of co-balt chemicals for non-metallic uses; M-39.

PD-154-a..Order for reservation of sheet steel for container making; re. M-45.

PD-155-a.. Authorization to process steel for containers, re. M-45.

Forms Which Do Not Have to Be Filed

• • • Priorities Regulation No. 8, issued March 16, 1942, eliminated a number of forms which in the past have had to be filed in connection with various priority orders. Table A below lists forms which do not have to be filed in the future, except to the extent required by the orders listed in table B.

Table A-PD Forms

6	41	45	52	63	74
6A	4IA	45A	52A	63A	74A
13	42	46	56	64	81
14	42A	46A	56A	65	81A
30	43	47	57	68	93
30A	43A	47A	57A	68A	
38	44	48	58		
	44A	48A	58A		

Table B-P Orders

(Reports Must Be Filed with These Orders)

19	29	51	73	87
19-a	42	55-a	82	95
19-е	42-a	62	86	115
19-h	43	65		
		68		

Form No.

Description PD-156-a.. Application for preference rating for steel sheets for drums; re. P-76.

PD-157....Report of sales of rebuilt machine tools; re. P-77.

PD-158-b. . Obsolete.

PD-158-c. . Obsolete.

PD-158-d. . Chemical manufacturer's report on chlo-

PD-158-e. . Purchaser's report on chlorine.

PD-159-a.. Producer's monthly report of chlorine production; re. M-19.

PD-159-b..Distributor's monthly report of distribution of chlorine sales; re. M-19.

PD-159-c.. Consumer's monthly report of chlorine use in his own plant; re. M-19.

PD-159-d. . Chlorine report certification.

PD-159-e. . Monthly report on chlorine consumption.

PD-160....Purchaser's monthly certificate of necessity for freon refrigerants; re. M-28.

PD-162.... Factory receipts, consumption and stocks of freon refrigerants; re. M-28.

PD-164....Producer's monthly report of production, stocks and sales of freon refrigerants;

PD-165..., Request for name of supplier of material covered by PD-1-a.

PD-166....Application for priority rating for material for blind-made products; re. P-82.

PD-167....Copper user's request for relief under hardship clause of copper conservation order: re. M-9-c.

PD-169....Producer's monthly steel plate rolling schedule; re. M-21.

Form No. Description

PD-170....Manufacturer's monthly report on domestic vacuum cleaner production; re. L-18.

PD-171....Cancelled.

PD-172....Application for permission to use copper or copper alloy material in stocks affected by order M-9-c.

PD-173....Monthly report of producers, approved smelters and fabricators of magnesium and magnesium products; re. M-2-b.

PD-174....Report of magnesium powder received, shipped and inventories, and disposition of scrap; re. M-2-b.

PD-175....Customer's statement to supplier of copper or copper base alloy products concerning end use of copper ordered.

PD-176....Obsolete.

PD-177....Manufacturer's monthly report of domestic ice refrigerator production; re. L-7.

PD-178-a.. Producer's application for allocation of phenol and ortho cresol.

PD-178-b. Producer's application for allocation of meta para cresol and cresylic acid.

PD-179....Application for preference rating for material for rebuilding machine tools; re. P-77.

PD-180....Consumer's monthly application for allocation of phenols; re. M-27.

PD-182....Manufacturer's monthly report of production of slot machines; re. L-21.

PD-183....Application for preference rating for steel plates and electrodes for welders' training classes; re. P-92.

PD-185....Report of inventory and consumption of sperm oil; re. M-40.

PD-186....Report of sales and inventories of burlap by importer, importing bag manufacturer and non-importing bag maker; re. M-47. (Initial report.)

PD-188....Monthly report of sales and inventories of burlap by importers, importing bag makers and non-importing bag makers; re. M-47. (Subsequent reports.)

PD-188-a.. Report of unbroken burlap bales.

PD-189....Report required under paragraph (a)
(4) (iv) of copper conservation order
M-9-c.

PD-190....Consumer's certificate to accompany all orders for chlorine; re. M-19.

PD-190-a.. Monthly report (by 15th) of pulp and paper makers showing chlorine use, etc.; re. M-19.

PD-191....Producer's monthly report of proposed schedule of chlorine shipments; re. M-19.

PD-191-a..Chlorine producer's delivery schedule; re. M-19.

PD-192....Report of iron and steel use in cooking appliances; re. L-23.

PD-192-a. Report of output and amount of iron and steel in cooking appliances; re. L-23.

PD-193-a....Schedule of withdrawals and amount of stores or inventories (water systems); re. P-46.

PD-194-a. Electric utility's report of withdrawals and inventories; re. P-46.

Form No. Description

PD-195-a.. Natural and manufactured gas utility's report of withdrawals and inventories; re. P-46.

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PD-197....Report of shipments of lead and lead alloys.

PD-198....Report on pulp shipments; re. M-52.

PD-200....Application for rating for defense project.

PD-200-a.. Project material list; re. P-19.

PD-201....Allocation order; re. M-21-b.

PD-203....Appeal for relief from terms of order curtailing cooking, heating appliance production; re. L-23.

PD-205....Monthly report of makers of domestic laundry equipment.

PD-209-a.. Monthly (by 20th) report of vanadium consumption and allocation request; re. M-23-a.

PD-209-b.. Application for allocation of vanadium; re. M-23-a.

PD-210....Report on iridium inventories.

PD-211....Report on iridium sales and transfers.

PD-212....Application for priority rating for material for smelters and refiners of specified metals; re. P-73.

PD-213....Monthly application for allocation of tin; re. M-43.

PD-214-a Request for permission to expand or construct oil producing facilities; re M-68-c PD-214-c (issued by Office of Petroleum Coordinator).

PD-217....Report of stock of hog and pig bristles; re. M-51-a.

PD-221....Report to be filed by all owners (except warehouses) of iron or steel having more than 4% Cr; re. M-21-d.

PD-222-a.. Application for instructions concerning contracts for imported material affected by order M-63.

PD-222-b.. Report to Metals Reserve Co. concerning contracts for imported materials when such has not yet arrived; re. M-63.

PD-223....Purchaser's certificate to accompany each order for toluene; re. M-34.

PD-224....Toluene producer's monthly schedule of proposed shipments; re. M-34.

PD-226....Copper scrap producer's monthly report.

PD-227....Copper warehouse report.

PD-228....Semi-annual report of steel producer operating under amendment No. 1, to order P-68.

PD-229....Appeal for relief from terms of tin conservation order M-43-a.

PD-231....Report of rubber consumption by product.

PD-234....Application for relief from terms of order M-38-c.

PD-235....Supplier's monthly report of inventories of jewel bearings and material; re. M-50.

PD-236....Consumer's monthly report on use of jewel bearings and materials; re. M-50.

PD-238....Customer's report of receipts of sodium nitrate.

PD-240....Customer's weekly report of wastepaper conservation.

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Form No. Description

PD-248....Report of purchases; re. P-73.
PD-249....Copper dealer's monthly (by 10th) report; re. M-9-d; send to Bureau of Mines.
Replaces PD-120.

pp-248-a.. Supplier's application; re. P-73.

pp.251....Monthly report on asbestos building material; re. M-79.

PD-252....Monthly report on textiles and packaging, re. M-79.

PD-253....Same as PD-251 and 252, except it is field only upon request.

PD-256....Appeal for relief from terms of order M-73.

PD-258....Request for priority serial number; re. P-106.

PD-264....Iron and steel scrap allocation order. PD-265....Report on tung, perilla and oiticica oil inventories.

PD-269....Appeal for relief from terms of tinplate order M-81.

PD-271....Allocation under order M-66.

PD-272....Aluminum smelter's monthly scrap report.

PD-275....Survey of uses of critical materials. Oblete after Feb. 20.

PD-277....Customer's form to accompany all orders to suppliers of products containing chlorine, except as in PD-190-a; re. M-19.

PD-285....Producer's application to apply A-3 rating for material for canning plant repairs; re. P-115.

PD-293....Corundum supplier's monthly report (by 10th); re. M-89.

PD-294....Corundum consumer's monthly report.

PD-295....Report of dealer and distributor of rhodium salts and plating solution concerning sales and deliveries; re. M-95.

PD-296....Rhodium plater's report on stocks; re. M-95.

PD-298....Monthly report on requirements of steel plates.

PD-299....Monthly report on consumption of steel plates.

PD-303-a.. Monthly request of manufacturers for permission to accept delivery of graphite for crucible making, re. M-61. Form No. Description

PD-303-b.. Monthly request of supplier for permission to deliver graphite, re. M-61.

PD-307....Weekly report of shot and bullet core steel producer.

PD-308....Monthly report of purchaser of shot and bullet core steel.

PD-310....Civilian application to local office of ODT for permission to purchase a commercial vehicle; re. M-100.

PD-312....Application for authorization to use aluminum paint or pigment, (not required for retail distribution to consumer); re.

PD-313....Monthly report (by 15th) of aluminum paint and pigment maker, formulator, and jobber; re. M-1-g.

PD-317....Report of refrigerators on hand; re. L-5-b. Obsolete.

PD-318....Jute processors initial report; re. M-70. PD-319....Appeal for relief from terms of M-70.

PD-321....Washington approval of application by civilian for purchase of vehicle; re. M-100.

PD-322....Form permitting sale of motor vehicle to Army, Navy, or foreign government.

PD-342...Report of canner; re. M-86-a.

PD-343....Report of canner; re. M-86.

PD-351....Quarterly report of railroad; re. P-88 (is returned by WPB).

PD-352....Quarterly report of railroads; re. P-88. PD-354....Report of inventories of certain high lauric acid oils, to be filed by April 15, re.

M-60.

PD-355....Report on palm oil inventories to be filed by April 15, re. M-59.

PD-358....Monthly (by 20th) application for allocation of molybdenum, re. M-110.

PD-359.... Monthly application for allocation of molybdenum, re. M-110.

PD-360....Customers form to accompany all purchase orders for molybdenum, re. M-110.

PD-371....Application by aluminum or magnesium fabricator or producer for priority certificate serial number, re. P-120.

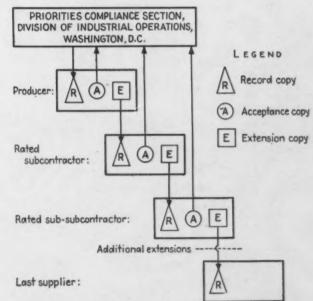
PD-372....Producer's and fabricator's quarterly report of use of ratings, re. P-120.

How to Extend "P" Orders

**The procedure for extending general preference riers, or P orders, is outlined in the accompanying what. This procedure is common to all P orders rept: P-19-e, P-46, P-54, P-55, 19-e, 54, 55, 56, 56-a, 7, 58, 68, 71, 72, 73, 85, 89, 90, 91, 92, 95, 98, 98-a, 10, 103, and 107. For extending these exceptions, at top of page 22.

The following orders, in accordance with the speterms of each order, require a single signature producer or rated subcontractor: P-5-b, 6, 11-a, 12, 4, 19, 19-a to 19-g, 20, 21, 23, 25, 25-a to 25-e, 26-a 26-e, 29 amended, 31, 35, 39, 40, 41, 41-a, 42, 42-a, 45, 45-a, 47, 51, 52, 53, 55, 62, 65, 74, 75, 76, 77, 78, 82, 83, 86, 87

The following require BOTH acceptance and certate signed by producer or rated subcontractor: 7,8,10,14-a,14-b. (Continued on page 22)



Exceptions to General Extension Procedure

	PREFERENCE RATING ORDERS P NUMBERS						
	19E	46	54,57 58,100,107 —	55	56 68	56A,71,72,73, 85,89,90,91, 92,95,98A,103	98
INITIAL RECORD COPY	SERIALLY NUMBERED TO HIGHWAY DEPT	UNNUMBERED REFERENCE COPY TO PRODUCER	PRODUCERS OBTAIN REFERENCE COPY	SERIALLY NUMBERED TO BUILDER	SERIALLY NUMBERED TO PRODUCER	SERIALLY NUMBERED TO PRODUCERS	OPERATOR OBTAIN REFEREN COPY
ACCEPTANCE TO WASHINGTON	NONE	IN DUPLICATE ONE TO WASH. ONE FOR FILE	NONE	NONE	NONE	NONE	NONE
EXTENSIONS TO SUPPLIERS	BY DEPT BY COPY OF ORDER TO SUPPLIERS LISTED BY CONTRACTOR	BY CERTIFICATION	BY CERTIFICATION	SIGNED COPY OF ORDER	BY	UNSIGNED COPY OF ORDER & BY CERTIFICATION	BY &
SUPPLIER'S ACCEPTANCE	DETACH, SIGN & SEND TO WASH.	NONE	NONE	NONE	NONE	DETACH SIGN & SEND TO WASH	NONE
SUPPLIER'S EXTENSION	BY SIGNED COPY OF ORDER	BY	BY CERTIFICATION	SIGNED COPY OF ORDER	BY CERTIFICATION	UNSIGNED COPY OF ORDER & BY CERTIFICATION	BY CERTIFICATIO
SUCCESSIVE ACCEPTANCES AND EXTENSIONS	IN LIKE MANNER	BY CERTIFICATION	BY CERTIFICATION	IN LIKE MANNER	BY	IN LIKE MANNER	BY CERTIFICATIO

* OPERATOR MUST COMMUNICATE WITH OFFICE OF PETROLEUM COORDINATOR BEFORE APPLYING RATING.

Field Offices of WPB Bureau of Priorities

Field offices are organized to assist industry answer problems arising from the application of the priorities system. Consult these offices before taking your problems to Washington. Listed below are the addresses of all offices opened to date and the names of the office managers.

Alabama

BIRMINGHAM Phoenix Bldg., M. J. Lide.

Arizona

PHOENIX Security Bldg., C. S. Jamison.

Arkansas

LITTLE ROCK Rector Office Bldg., C. S. Christian.

California LOS ANGELES

1151 South Broadway, G. H. Hutchins. SAN FRANCISCO Federal Reserve Bank Bldg., A. L. Kerr.

Colorado

DENVER

U. S. National Bank Bldg., Virgil L. Board.

Connecticut

HARTFORD

805 Main St., E. L. Howard,

Florida

JACKSONVILLE 530 Lynch Bldg., G. H. Andrews. TAMPA

Wallace South Bldg., T. L. Hausmann.

Georgia

ATLANTA 150 Hurt Bldg., John B. Reeves.

Illinois

CHICAGO

20 North Wacker Drive, M. R. MacDonald.

Indiana

INDIANAPOLIS Circle Tower Bldg., Albert O. Evans.

DES MOINES 505 Crocker Bldg.

Kentucky

LOUISVILLE Todd Bldg., 4th and Market Sts., James T.

Louisiana NEW ORLEANS

422 Canal Bldg., John A. Bechtold.

Maryland

BALTIMORE Baltimore Trust Bldg., T. M. Chandlee.

Massachusetts

BOSTON

19 Congress St., William P. Homans.

Michigan

DETROIT Boulevard Bldg., James E. Wilson.

Minnesota

MINNEAPOLIS

326 Midland Bank Bldg., Willard F. Kies-

Missouri

KANSAS CITY Federal Reserve Bank Bldg., C. H. Carr. ST. LOUIS

810 Boatmen's Bank Bldg., L. E. Crandall. Montana

HELENA

Power Block House, Oscar A. Baarson.

OMAHA

Grain Exchange Bldg., R. H. Fair.

New Jersey

NEWARK 176 Sussex Ave.

New York

BUFFALO M & T Bank Bldg., Paul R. Smith. NEW YORK

122 E. 42nd St., S. Hogerton.

North Carolina

CHARLOTTE Liberty Life Bldg., J. E. MacDougall.

CINCINNATI 34 E. Fourth St., J. B. Harvey. CLEVELAND

Union Commerce Bldg., W. T. Walker, DAYTON

Third National Bank Bldg., H. B. Doty, Peputy

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OKLAHOMA CITY 414 Key Bldg., C. F. Aurand. TULSA

Kennedy Bldg., A. E. Ballin.

Oregon

PORTLAND Bedell Bldg., J. Fred Bergesch.

Pennsylvania

PHILADELPHIA 1617 Pennsylvania Blvd., F. W. Slad.

PITTSBURGH Grant St. and Ogle Way, C. C. Cruci

KNOXVILLE Goode Bldg., Dyer Butterfield. MEMPHIS

Sterrick Bldg., J. S. Bronson. NASHVILLE

1015 Stohlman Bldg., George S. Giller Texas DALLAS

Wood and Packard St., J. B. Crockett EL PASO El Paso National Bank Bldg., R. C. Str.

HOUSTON Federal Reserve Bldg., G. L. Noble. SAN ANTONIO

415 W. French Place, Carl L. Pool Utah

SALT LAKE CITY Utah Oil Bldg., Ralph E. Bristol. Virginia

RICHMOND 10 S. 5th St., F. P. Wilmer.

Washington SEATTLE

960 Stuart Bldg., W. D. Shannon. Wisconsin

MILWAUKEE First Wisconsin National Bank Bldg. Tharinger.

Directory of the War Production Board

All offices are in the New Social Security Bldg., unless otherwise indicated by letters in parentheses; for example, (TE) indicates an office in the Temporary E building, while (TR) indicates Temporary R building. Personnel included here are only those of interest to the metal working industry.

		Danald M. Walson
*	hairman ice-President iministrator, Office of Price Administration icial Assistant to the President Super pefense Aid Program	Leon Henderson
TION		
	Purchases Division	Tin, Lead and
TION	rector Douglas MacKeachie eputy Director James MacPherson	Chief
		Mica-Gro
	ccounting and Distribution Branch	Chief
	Contract Clearance Branch	Miscellaneous
H	hief	Chief
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181	Materials Division (TR)	Director
ofu 🛮	Director William L. Batt Deputy Director . A. I. Henderson Executive Assistant to the Director	Special Assistant to
ı	C. E. Rhetts	Contract Di
ı	Mining Branch (TE)	Chief
H	hief Wilbur A. Nelson	Staff Sei
ı	Aluminum and Magnesium Branch	Chief
	Chief A. H. Bunker	Chief
ł.	Chemicals and Allied Products	
ıcig	Branch Dief Ernest W. Reid	Ordna
		Tool
ı	Iron and Steel Branch	Chief
	Chief C. E. Adams	Shipbuil
en.	Power Branch Ulief J. A. Krug	Acting Chief
ı		Constru
it. iryli	Cork and Asbestos Branch	Acting Chief
Jr.	Nickel Branch	Division
	Chief Harry A. Rapelye	Ope
	Tungsten Branch	Director
	Chief Harris K. Masters	Assistant Director i
	Copper Branch	Plans and Progr Executive Assistant
ı	Chief H. O. King	

Zinc Branch

Manganese and Chrome Branch

...... David A. Uebelacker

..... Andrew Leith

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Tin, Lead and Ilmenite Branch ChiefErwin Vogelsang
Mica-Graphite Branch Chief
Miscellaneous Minerals Branch Chief
Production Division Director
Contract Distribution Branch Chief
Staff Services Branch Chief
Aircraft Branch Chief
Ordnance Branch ChiefE. F. Johnson
Tools Branch ChiefGeorge C. Brainard
Shipbuilding Branch
Acting Chief
Construction Branch Acting Chief
Division of Industry Operations
DirectorJames S. Knowlson Special Assistant to the Director H. K. Clark Assistant Director in Charge of Plans and ProgramsBlackwell Smith

Executive Assistant (TE)...Carl K. Tranum

Bureau of Priorities

Assistant Chiefs— J. P. Gregg

In charge of internal operations

C. C. Crossland

Chief ..

......C. H. Matthiessen, Jr.

Department Pro Secretary of the M Federal Loan Adm Secretary of War.	l in Charge of War duction
nenite Branch Erwin Vogelsang e Branch Howard F. Wierum	In charge of policyJ. H. Martin In charge of enforcementL. J. Martin In charge of requirementsH. P. Nelson In charge of priority specialists S. S. Stratton Assigned to Army and Navy Munitions BoardC. C. Crawford
nerals BranchRichard J. Lund	Review and Approval Branch Chief S. L. Phraner Inventory Branch ChiefE. A. Tupper Assistant, InventoriesG. P. Torrence
DivisionW. H. Harrison Director George Wilde ution Branch Walter H. Wheeler as Branch George A. Landry Branch	Assistant, Investigation H. J. Dowd Distributors Branch Chief L. C. White Compliance Branch Chief J. H. Ward Production Requirements Branch Chief A. L. Williams Education and Industrial Contact Branch Chief E. E. Pratt Industrial Contact Section M. Manghum Head Priority Specialists Division of Production W. G. W. Glos Office of Petroleum Coordinator J. E. Hughes Division of Materials H. K. McCook Division of Industry Operation J. M. Tucker
Merrill C. Meigs Branch	Procedure Section ChiefE. V. Russ
anch George C. Brainard J BranchJ. O. Gawne	Bureau of Industry Advisory Committees Chief
Branch W. V. Kahler	Bureau of Industry Branches
Industry	Chief Philip D. Reed Deputy Chief Amory Houghton

Automotive Branch (TE) Chief Ernest Kanzler

> Rubber and Rubber Products Branch (TE)

Chief Arthur Newhall Textile, Clothing and Leather

Goods Branch

Food Supply Branch Chief...... Douglas C. Townson

..... B. Alexander

	Health	Supplies	Bran	ch	
Chief.		Willian	n M.	Bristol,	Jr.
		Section 1			

Technical and Safety Equipment
Branch
Acting Chief......William M. Bristol, Jr.

Industrial and Office Machinery Branch (TE)

Chief..... Nathaniel G. Burleigh

Pulp and Paper Branch (TE) ChiefNorbert A. McKenna
Printing and Publishing Branch (TE) Acting ChiefGeorge A. Renard
Communications Branch (TE) Chief Leighton H. Peebles
Special Industrial Machinery ChiefL. S. Greenleaf, Jr.
Construction Machinery Chief
Commercial Refrigeration, Air Conditioning
General Industrial Equipment Chief C. S. Williams
Transportation (TE) Chief
Farm Machinery (TE)

	Bureau of Field Operations (TE)
Chief.	L. E. Scrin
Bur	eau of Governmental Requirements
Chief	Maury Mavel
	Bureau of Industrial Conservation (TE)
	Chief Lessing J. Roseman

Chief Harvey A. Anderso
Salvage
Acting Chief Paul Cobo

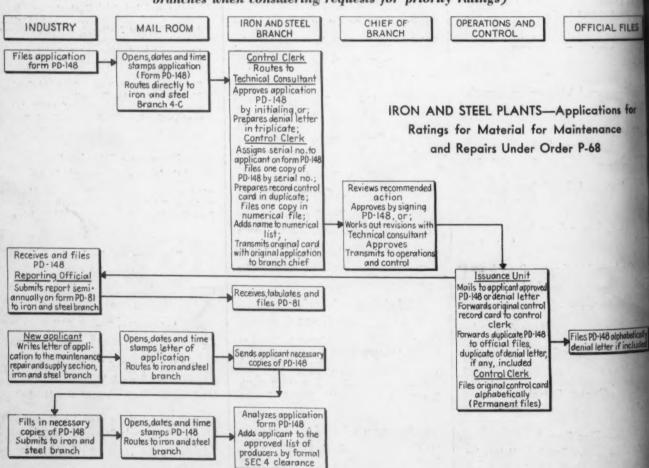
Simplification

Chief..... Howard Cooks

How Priority Applications Are Handled

Chief......W. R. Tracy

(This flow sheet shows typical steps taken by War Production Board branches when considering requests for priority ratings)





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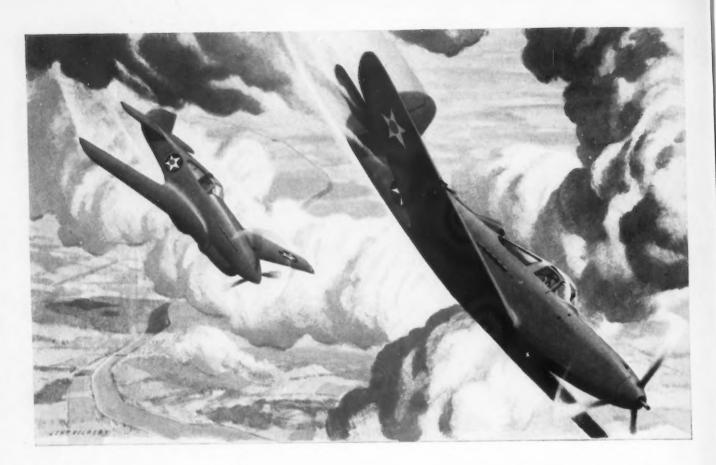
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AMERICA'S PIONEER PRODUCER OF MAGNESIUM REPORTS TO THE AMERICAN PEOPLE

TH

EVERY AMERICAN is entitled to know how his own personal efforts in this great national emergency are being matched by fellowworkers in other defense activities.

We, therefore, consider it our duty to report on what we have done—are doing—and will do to meet the nation's mounting needs for magnesium.

Magnesium is the lightest of all structural metals—a full third lighter than aluminum. Its critical value is in contributing to American air supremacy—in saving those vital pounds that spell superior fighting speed—longer cruising range—greater load capacity.

Magnesium, therefore, is of deep interest to every American who holds dear the national heritages of our past—the hopes of our future.

WHERE AMERICA STOOD IN 1939

The Dow Chemical Company began production of American made magnesium metal in 1915. It developed its own producing process, releasing this country from any dependence upon foreign sources of magnesium supply.

But, the manufacture of metal was only the first step. It required years of research and experience to develop a range of practical magnesium alloys (Dowmetal) to serve in various applications. Methods of fabrication had to be adapted to conform to the specialized characteristics of magnesium. And, equally important, American industry had to be familiarized with this ultra-light metal—to learn by test and experience how it could serve many needs. All these steps took time.

Despite all these factors, Dow, as the sole producer of magnesium for American industry, had developed by 1939 a domestic market requiring an annual production of 6,000,000 pounds—a notable accomplishment.

THE MAGNESIUM SITUATION IN 1940



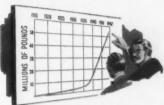
Early in 1940, Dow, having already sensed the rising need for magnesium in the awakening defense program, had voluntarily doubled the production facilities of its Midland plant.

Fast on the heels of this first step in a vast expansion program came even greater—more startling news. In March, 1940, Dow announced to American industry one of the most significant advances in modern chemical engineering—the first extraction of magnesium metal from the sea. This was the logical result of a long experience in the chemistry of natural brines.

Acquiring a 1000 acre site on the Gulf of Mexico at Freeport, Texas, work on a mammoth magnesium plant was started without an instant's delay.

Working at incredible speed—using at times a construction crew numbering 4,800 men—the first unit of this plant was completed and began production in the record-breaking time of ten months.

THE MAGNESIUM PICTURE IN 1941



On January 21, 1941, the first magnesium was poured—and shipped—from Dow's Freeport plant. This was the first time in history that magnesium metal had been ex-

tracted in commercial quantities from sea water—a goal long sought but never before realized.

Combined with the already doubled production of magnesium at Midland, this made available an annual production rate of 36,000,000 pounds—a six-fold increase in our national magnesium supply in slightly over a year!

As the year 1941 progressed so did the production facilities for magnesium. By the end of the year, American aircraft and other defense producers measured Dow's magnesium production at over 50,000,000 pounds annually—a considerably greater tonnage every 45 days than was formerly required by American industry in an entire year.

A LOOK AT TODAY-AND TOMORROW

Today, magnesium is rolling out of Dow's Midland, Michigan, and Freeport, Texas, plants in unprecedented volume and production is constantly mounting. In addition



Dow is now building at great speed new plants for the government that will overshadow in size and capacity any now in existence in this country.

During those years when only the more progressive of American industrial engineers were utilizing the light-weight characteristics of Dowmetal, it would have seemed fantastic to think that some day the demand for this metal would soar to such stupendous heights.

Yet that day is here and Dow is meeting the challenge as a great opportunity to do a national duty. And, if tomorrow more is asked—Dow wants you, and every American, to know it will respond with every ounce of effort—every resource—at its command.



MASWE FJAL



THE DOW CHEMICAL COMPANY . MIDLAND, MICHIGAN

New York · St. Louis · Chicago · San Francisco · Los Angeles · Seattle · Houston

CHEMICALS INDISPENSABLE TO INDUSTRY AND DEFENSE



Let a Mechanite Foundry Solve Your Casting Problems

Ansonia, Conn.
Farrel-Birmingham Co., Inc.

Bridgewater, Mass. The Henry Perkins Co.

Buffalo, N. Y.
Pohlman Foundry Co., Inc.

Charleston, W. Va. Kanawha Manufacturing Co.

Chattanooga, Tenn. Ross-Meehan Foundries

Chicago, III.
Greenlee Foundry Company

Cincinnati, Ohio
Cincinnati Grinders Incorporated

Cincinnati, Ohio
The Cincinnati Milling Machine Co.

Cloveland, Ohio
Fulton Foundry & Machine Co.

Denver, Colo.
The Stearns-Roger Mig. Co.

Detroit, Mich. Atlas Foundry Co.

Flint, Mich.
General Foundry & Mfg. Company

Hamilton, Ohio
The Hamilton Foundry & Machine Co.

Irvington, N. J. Barnett Foundry & Machine Co.

> Los Angeles, Calif. Kinney Iron Works

Milwaukee, Wis. Koehring Company

Mt. Vernon, O., Grove City, Pa. Cooper-Bessemer Corporation

New York, N. Y.
The American Brake Shoe
& Foundry Co.

Oakland, Calif. Vulcan Foundry Company

Orillia, Canada E. Long, Ltd.

Philadelphia & Bethayres, Pa. H. W. Butterworth & Sons Co.

Philadelphia, Pa.
Florence Pipe Foundry & Machine Co.,
(R. D. Wood Company, Selling Agents)

Phillipsburg, N. J. Warren Foundry & Pipe Corp.

Pittsburgh, Pa.
Meehanite Metal Corporation

Pittsburgh, Pa.
Rosedale Foundry & Machine Co.

Rochester, N. Y. American Laundry Machinery Co.

St. Louis, Mo. Banner Iron Works

St. Paul, Minn. Valley Iron Works

London, Eng.
The International Mechanite
Metal Co., Ltd.

Waterloo, N. S. W. Australian Mechanite Metal Co., Ltd.

Johannesburg, South Africa Meehanite Metal Co. (S.A.) (Pty.) Ltd.



FROM C

MONTHS BEHIND SCHEDULE TO 21/2

OF SCHEDULE

Meehanite castings for work spindle and spindle gear, made by Farrel-Birmingham Co., Inc.

Almost a year has been gained in delivery of special lathes used for machining British shells through a change to Meehanite castings for several important parts! Due to difficulty in securing materials it appeared that deliveries of these vitally needed tools would be 9 months behind schedule. But by specifying Meehanite, deliveries were actually made $2\frac{1}{2}$ months ahead of schedule! Performance of these lathes in service has amply proved the forecast that Meehanite would do the service job required.

Meehanite castings offer many advantages to equipment and machinery manufacturers. Combining the best properties of cast iron and steel, this metallurgically controlled cast metal provides high strength, good wearing qualities, and adaptability to heat-treatment and flame-hardening. Design characteristics are reliable and such engineering properties as high damping capacity, good machinability, and maintained dimensional accuracy are provided. Let the nearest Meehanite foundry show you how to use this modern cast metal to your advantage and profit!

fo

MEEHANITE RESEARCH INSTITUTE · 311 ROSS STREET · PITTSBURGH, PA.



Write for Engineering Bulletin No. 9—"Meehanite, the Metal for Machine Tool Castings."

FAMOUS LIFE LINES





NEW TUBING uses spring up every day, and in a surprisingly large number of cases, if these uses call for tubing within the range of Bundy's sizes, one or another of the three types of Bundy tubing will do the job required.

For Bundy tubing—with its strength, its duetility, its resistance to vibration fatigue, and the ease with which it may be fabricated—is adapted to a wide range of mechanical uses in addition to its long recognized excellence for transmitting hydraulic pressures, or for carrying lubricants, fuel and refrigerants.

Structural tubes for furniture, lamps and fixtures, spacers, conduit tubing, capillary tubing — these are a few of the less well known peace-time uses of Bundy tubing. And each of them has its similar use, or its counterpart, in defense manufacture.

Do you use tubing in or near Bundy's sizes? Then perhaps Bundy can help with your tubing problem, whether you require tubing only in commercial lengths, or prefer to have Bundy furnish you complete, fabricated parts with necessary fittings assembled. Bundy Tubing Company, Detroit, Michigan.





BUNDYWELD double-walled steel tubing, hydrogen-brazed, copper-coated inside and outside. From Capillary sizes up to and including Tr 0.D. This double-walled type is also available in steel, tin-coated on the outside, and in Monel.



BUNDY ELECTRIC WELD steel tubing. Single-walled — butt welded — annealed. Also furnished tin-coated outside if desired. Available in sizes up to and including 5% 0. D.



BUNDY "TRIPLE-PURPOSE" MONEL tubing. Double-walled, rolled from two strips, joints opposite, welded into a solid wall. Available in all Monel, Monel inside— -steel outside, and Monel outside—steel inside. Sizes up to and including 5%"O. D.

INSIDE STORY









LA SALLE'S HIGH RATING

Among Cold Finished Steel Bar Users

Unsurpassed Manufacturing Facilities Only One of the Reasons Behind la Salle Quality and Dependability

★ These days, hardly a week passes that does not see industry breaking previous operating records . . . setting new production highs. Against that background, the factors which have earned La Salle an enviable reputation among cold finished steel bar users stand out in sharp relief.

Principal of these tactors are the time-saving, productionspeeding steels developed by La Salle and proved in the plants of hundreds of users. Typical examples are La Salle 1020-90 which is making it possible for users to assure maximum carburizing response and machinability from a .20 carbon steel... STRESSPROOF which is making it possible for machine tool makers to reduce straightening operations and step up machining rates . . . and TRITEX No. 2 Thermalized which is proving highly valuable in the manufacture of lead screws and splined shafts when the full physical properties of STRESSPROOF are

Behind these steels is a story of foresight and resourcefulness ... an "inside story" of a plant with efficient modern equipnot required. ment, skilled and competent workmen, experienced metallurgists, and forward-looking management. This is the story that helps explain why La Salle is supplying its share of the steels that are proving real aids to plants engaged in essential defense

production.

CARRYING OUR SHARE DEFENSE LOAD



Supplying cold finished steel bars in ever-growing quantities for defense industries—that's the job La Salle is now doing under the re-armament program. Here is a representative listing of the many products calling for and receiving La Salle steels:

Aircraft Accessories Aircraft Air Frames Airplane Landing Gears **Army Tanks Army Trucks Army Scout Cars** Army Shells

Browning Machine Guns Curtiss Wright Motors Pratt & Whitney Motors Oerlikon-Gazda Guns Navy Shells and Fuse Parts Marine Motors



nutacturer of the Most Complete Line of Cold Finished Steel Bars in America

IGINEERED QUALITY * ADVANCED RESEARCH



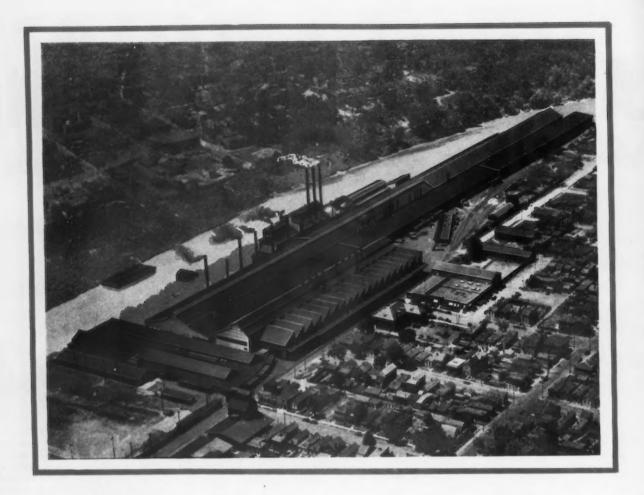
ODAY'S PRODUCTION schedules are crowding 1943 estimates. Such has been the amazing progress of American industry in meeting the nation's defense requirements, and the needs of those who look to us for aid in this emergency.

Industry is showing its resource-

fulness, its superlative abilities to cope with any situation. It has rolled up its sleeves, spit on its hands, and with quiet determination set about the task of producing more and still more! Andrews Steel is honored to be placed in a position of service, and accepts its responsibilities gladly.

GLOBE PRODUCTS: Galvanized Iron and Steel Roofing and Formed Sheet Metal Building Materials.





Doing first things FIRST

In times like these every basic raw material producer has one all important obligation: Maintaining an uninterrupted flow of priority materials for national defense. In this all industrial America wholeheartedly concurs, despite the fact that such action creates numerous raw material shortages and sharply curtailed production schedules in many plants.

The facilities of Newport and associate companies are unreservedly dedicated to the preservation of America, by doing First Things First.



ANDREWS BASIC OPEN-HEARTH ALLOY STEEL BILLETS AND SLABS



DISTRIBUTOR FIRST

He's in a tough spot, too...

BUT NEVER TOO TOUGH TO HELP YOU

• If you think you're hard hit by material shortages, consider your Republic Distributor.

It's his job to stock and deliver the steels and steel products you need. He has built his business, invested his money and trained an organization to do it. He has always said "Yes" to all demands for Republic sheets, pipe, bolts and nuts, cold finished bars and shafting, boiler tubes, electrical conduit. But now, Production for Victory may force him to say "No, you can't have all your order" to some of his best friends.

Yet, he knows his customers are depending on him. He feels he must come through — some

way. And when a man with that attitude is plugging for you, results are more likely to follow.

Tough as his position is, he's still getting results in meeting production emergencies. He still can supply you with sufficient amounts of some steels and steel products to make essential repairs, or to tide you over on war orders until mill shipments arrive. If he doesn't have the items you need, he will do everything possible to get them for you.

See your Republic Distributor first—and learn what he can do about your steel and steel product supply problems. Republic Steel Corporation, Cleveland, Ohio.

BERGER MANUFACTURING DIVISION
CULVERT DIVISION
NILES STEEL PRODUCTS DIVISION



STEEL AND TUBES DIVISION UNION DRAWN STEEL DIVISION TRUSCON STEEL COMPANY (Subsidiary)

CALL YOUR Republic



COPYRIGHT 1942 JONES & LAUGHLIN STEEL CORPORATION

THE "WILL TO DO" FOR VICTORY IS

J&L, and in greater volume and finer quality than ever before. The "will to do" for victory has inspired the men of all departments and divisions of the organization to quicken the tempo of production. These men — thirty-five thousand strong — working with foremen, superintendents, executives who themselves came up from the ranks — are establishing many new all-time production records.

New "highs" have been made in the mining and lake shipping of iron ores from subsidiary properties in the Lake Superior region; in the mining and river shipping of coal from the company's mines in Western Pennsylvania; and in the handling of materials by subsidiary railroads. Twenty-four hours a day, seven days a week at the steel plants these raw materials are being converted into more coke in byproduct ovens, as well as more by-products essential to defense; into more iron in towering blast furnaces; more steel in Flame Controlled Bessemer converters and open hearth furnaces. Day after day, night after night, turn after turn, mill crews go after records

JONES & LAUGHLIN

AMERICAN "IRON PITTSBURGH,

J&L - PARTNER TO



260-THE IRON AGE, January 1, 1942



FROM AN ORIGINAL DRAWING BY URISON MACPHERSON

PRODUCING MORE STEEL AT J&L

that seemed unbeatable, and set up many new ones, while producing millions of tons of Controlled Quality steel products for American industry to apply to all the vast stores of *matériel* and materials so urgently required for the upbuilding of this Nation's armed strength and fighting power in a war-torn world.

These goals are being reached by the full employment of all steel-making facilities, and the men that man them, augmented by the various offices and the services stemming from them, by sound engineering, by the invention and adoption of new devices and better methods—holding fast all the while to the control of quality that marks every ton of steel produced.

Through all this increased pace of production the men are going about their jobs with splendid teamwork, making new safety records, keeping their work among the safest in the whole field of industry. Meanwhile the men in research count this period as one in which to learn and plan for a new era when steel will more fully serve mankind in the creation of a new world, a free world, a better world in which to live.

STEEL CORPORATION

AND STEEL WORKS

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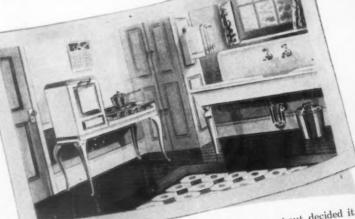
INDUSTRY FOR VICTORY



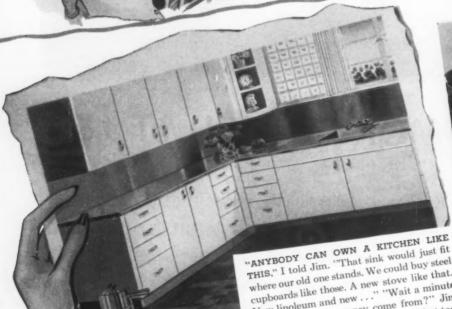
THE SATURDAY EVENING POST

" Honey, here's the Xmas Gift I want IN NINETEEN-FORTY-UMPH!"





YOU KNOW MY SAD OLD KITCHEN. I had just about decided it was hopeless to do anything about the "open plumbing," the musty was nopeless to do anything about the "open plumbing," the musty old closets, the funny old sink. Then last Sunday Jim and I visited a proper Speed house." and together up had a brilliant idea. "model house" and together we had a brilliant idea . . .



THIS," I told Jim. "That sink would just fit where our old one stands. We could buy steel cupboards like those. A new stove like that.

New linoleum and new . . . "Wait a minute -where does the money come from?" Jim —where uses the money come from : Jim interrupted. But I had the answer to that too.



"IN MY CHRISTMAS STOCKING you're going to put a very special present—for me from you. Know what it is? A U. S. Defense Bond. I'll give Anow what it is: A U. S. Defense Bond. I fight you one too. They'll be part of our new kitchen. Jou one too. They it be part of our new kitchen. Little by little we'll put away more U. S. Bonds and some day—sooner than we think, maybe—these bonds will pay for our dream kitchen.

- afts were promised to give ourselves







Novel sink for my next kitchen will be this patent sink that disposes of every crumb. I'll be able to wash every dishes without even wel-and dry my dishes without even wel-ting my hands. P.S. Made with U.S.S Vitrenamel.

UNITED STATES STEEL

CARNEGIE-ILLINOIS STEEL COM Pittsburgh - Chicago - Columbi San Francisco - TENNESSE (O RALLROAD CO., Birmingheri Steel Export Co., New York Products Co., Chicago, Ward

"What's the idea of making people want what they can't get?"

HAT'S a fair question to ask. Probably it popped into your mind when you read the advertisement opposite that recently appeared in the Saturday Evening Post and other national magazines. If you haven't seen it before, take just a moment and read it now, won't you? It's important to you.

If you manufacture steel products it is only natural that you wonder why we seem to push such products when everyone knows they're going to be harder and harder to get.

Well, here's exactly why. It is because we want people to want products made of steel even though they may be increasingly difficult to buy—and to keep on wanting them, so that they will go out and buy such products when they again become easily available.

Because we believe that advertising like this is nothing less than *prosperity insurance* for the future—both for you and for ourselves—we plan to continue it.

For, one of these days when the clouds roll by, the production of simple, everyday things like paring knives and flour sifters, refrigerators and kitchen cabinets will once again become the Nation's prime endeavor. Then you—and we—will be able to realize fully on the accrued benefits of this advertising that keeps fresh in the public mind the comfort and convenience that steel can bring to them—and that shows them what the U·S·S label means in giving them their dollar's worth in extra satisfaction.

So when you plan your product for the future—plan to make it of $U \cdot S \cdot S$ Steels. Then, when the public sees your $U \cdot S \cdot S$ label, you'll find that they are already partially sold on your product, whatever it is, even before you start talking.

We would like to tell you more about this. Write us.

U·S·S National Advertising strikes new note

in the promotion of products made from steel. By the projection of buying into the future, it aims to keep alive the demand for these products. By emphasizing the for these products. By for steel quality, U·S·S label as a symbol for steel quality it provides additional sales support for any product bearing that label.

It is not a such questing allocating of comforts, distributions of warm good deal of Indeed, bids Senate has displeased

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and make the their fellow of ment, therefore

Parliament.

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CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago
COLUMBIA STEEL COMPANY, San Francisco

TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham

Scully Steel Products Company, Chicago, Warehouse Distributors
United States Steel Export Company, New York



THE 8 POINTS

of superiority that have made Harrisburg Seamless and Drop-Forged Steel products preferred wherever uniform quality and top-flight performance are required. Here you will find the complete story of why Harrisburg products are so much in demand.

- 1 To make a high quality product, the steel itself must be right and that is why Harrisburg makes its own steel thus insuring quality from the very start.
 - 2 Here is a self-contained steel plant . . . big enough to fill the large orders promptly and small enough to give personal attention to special requirements.
 - 3 Years of uninterrupted service, since 1853, have created a "Know-how" that only comes with long years of experience. Eighty-nine years of continuous manufacture is evidence of satisfactory customer service.
 - 4 Harrisburg plant and equipment is up-to-the-minute... thus making possible precision production at moderate cost. Plant additions and improvements have more than doubled production without sacrificing Harrisburg's traditional high quality.
 - 5 Harrisburg Superintendents, Foremen and Workmen are employees of long experience . . . experts who have come up through the ranks and artisans who know each complicated operation thoroughly.
 - 6 The Harrisburg organization is old in tradition and service over the years, yet up-to-date in the fast-changing "World of steel" of today.
 - A complete service organization of Engineers, Metallurgists, Chemists and Designers at your disposal for research and development work.
 - The world's largest producer of Seamless plate-made High
 Pressure Gas Cylinders and specializing in the production of
 Alloy and Carbon Steels; Seamless Steel Cylinders. Pipe
 Coupling, Pump Liners, Bull Plugs and Liquefiers; Hollow and
 Drop Forgings; Pipe Flanges; Aerial Bombs; Coils and Bends.

HARRISBURG

STEEL CORPORATION

HARRISBURG, PENNSYLVANIA

STAINLESS AND ALLOY STEELS

STRIP & SHEET

SHARON

National Defense program, and now wartime demands, have placed a new importance on stainless and alloy steels. Anticipating these needs, Sharon recently completed an expansion of facilities for producing stainless and alloy strip and sheet. Sharon's modern processes and close laboratory control assure a steady, increased production of these vital steels.

SHARON STEEL CORPORATION

Sharon, Pennsylvania



Hope our deliveries will give you A Happy New Hear...

AS the 1942 calendar sheds its leaves, what situations will be revealed regarding the availability of metals for manufacturing use?

WE haven't the answer, but coming events cast their shadows before, and right now priorities and allocations are dictating what shall be produced in many manufacturing plants.

N the mills of the Johnson Steel and Wire Company we shall be making wire in many special grades as usual.

QUR desire is to take care of the requirements of the thousands of both old and new customers who have depended upon Johnson Steel and Wire Company and have not been disappointed.

So—in 1942 whatever you need in "High Grade Steel" wire listed on this page, let's see if the Johnson warehouses in Los Angeles, Akron, Chicago, Toronto and Worcester can help you out. The source of wire supply to remember throughout 1942 is—JOHNSON!

AIRCRAFT CABLE WIRE
TEMPERED CARD WIRE
MUSIC WIRE
BRUSH WIRE
ROPE WIRE
COLD ROLLED SHAPE WIRE
COLD ROLLED FLAT WIRE
BRIGHT SCRATCH BRUSH WIRE
BRONZE PLATED WIRE

JOHNSON STEEL &

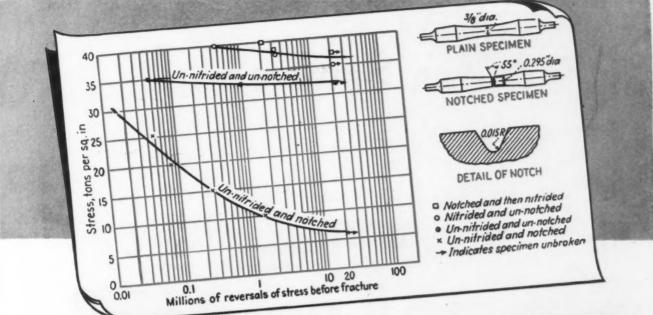
P. O. BOX 1211-MAIN OFFICE & PLANT BRANCH PLANTS, OFFICES AND WAREHOUSES



WIRE COMPANY, INC.

WORCESTER, MASSACHUSETTS

AKRON, OHIO • LOS ANGELES, CALIF.
DETROIT, MICH. • CHICAGO, ILL.
NEW YORK, N. Y. • TORONTO, CANADA



FATIGUE RESISTANCE TOO IS TRUE CONSERVATION

Lengthening the life of machine parts subject to failure by fatigue conserves vital metals for Defense—conserves also the productive capacity, power, personnel and transportation facilities otherwise required for replacements.

High in the scale of metals and methods that increase the fatigue-resisting power of steel, stand Nitralloy and the Nitriding process, widely recognized also as producing the hardest steel surface known.

NITRIDING

is the process of case hardening certain alloy steels by means of a nitrogenous medium, such as ammonia gas. The alloy steels that are most suitable for Nitriding are known as

NITRALLOY

Use Nitrided Nitralloy for steel THIS NEW BOOK parts subject to fatigue and frictional wear—to multiply the service life of our defense equipment, to promote the safety of our armed forces, to create more durable production machinery.



This book is a study of the conditions which increase the resistance of metals to fatigue caused by relipeated stresses, and as faffected by stress-raisers such as notches, screw threads, keyways, poor fillets, etc. A valuable bibliography supplements the 40 pages of text and charts. Your copy will be mailed promptly with our compliments on receipt of your request to us or to any of the licensees listed below.

THE NITRALLOY CORPORATION

230 PARK AVENUE

Companies Licensed by The Nitralloy Corporation

ALLEGHENY LUDLUM STEEL CORPWATERVLIET, N. Y.
BETHLEHEM STEEL COBETHLEHEM, PA.
COPPERWELD STEEL COWARREN, O.
CRUCIBLE STEEL CO. OF AMERICANEW YORK, N. Y.
FIRTH-STERLING STEEL COMcKEESPORT, PA.
REPUBLIC STEEL CORPORATIONCLEVELAND, O.
THE TIMKEN ROLLER BEARING COCANTON, O.
VANADIUM-ALLOYS STEEL COPITTSBURGH, PA.
ATLAS STEEL LIMITEDWELLAND, ONTARIO

Operating and Accredited Nitriding Agents

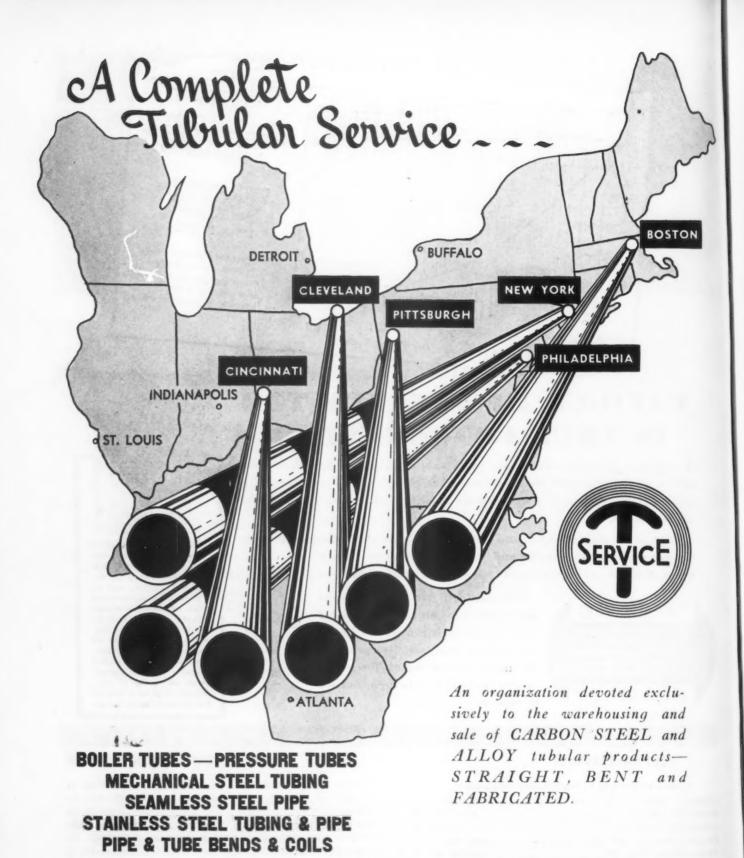
CAMDEN FORGE CO
COMMERCIAL STEEL TREATING CORPDETROIT, MICH.
THE LAKESIDE STEEL IMPROVEMENT CO

NEW YORK, N.Y.

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268-THE IRON AGE, January 1, 1942





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Today she and thousands of other courageous men and women are setting aside their cherished tasks. They're enlisting in the cause of democracy. They're tackling unfamiliar jobs . . . and they're doing them well.

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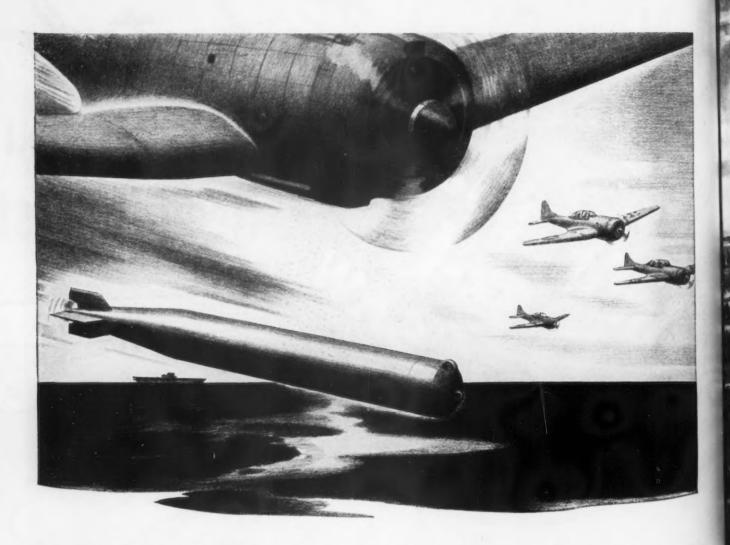
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THE IRON AGE, January 1, 1942-277



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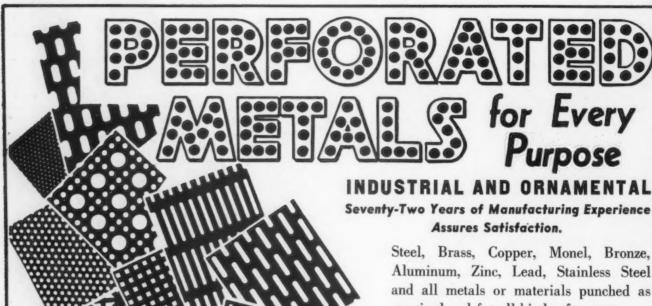
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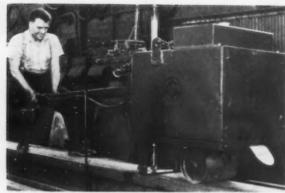
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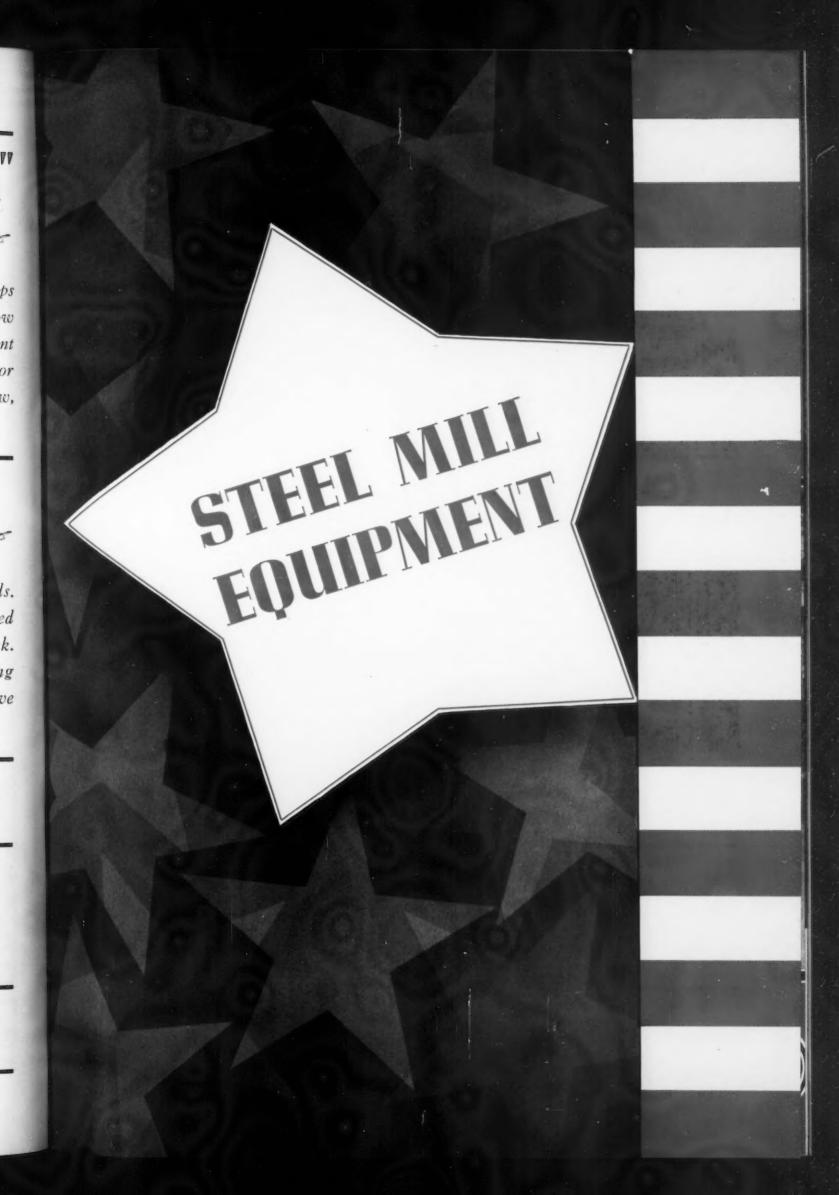
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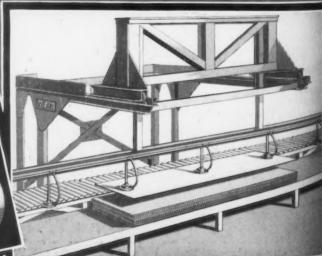


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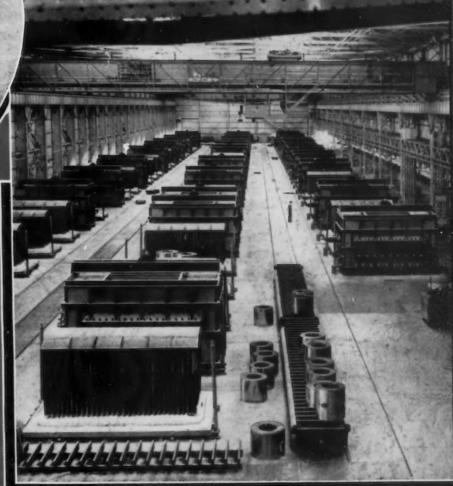
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McKAY builds all sizes of Bar and Tube Drawbenches for ferrous and non-ferrous industries.

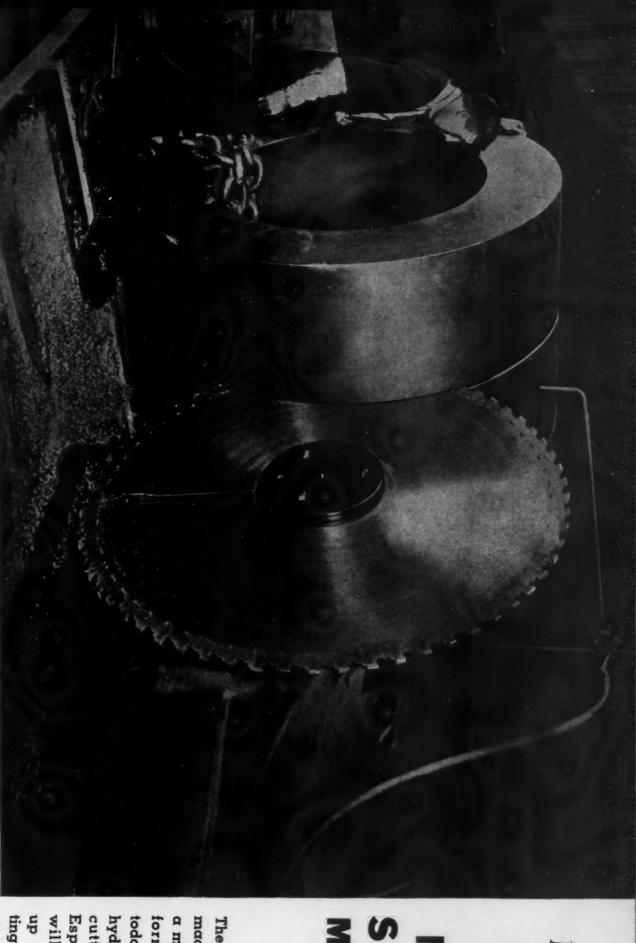
We solicit your inquiries.

McKAY

THE McKAY MACHINE CO

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMEN

YOUNGSTOWN, OHIO



THE ESPEN-LUCAS FRONT AND GIRARD AVE., PHILADELPHIA, PA. MACHINE WORKS

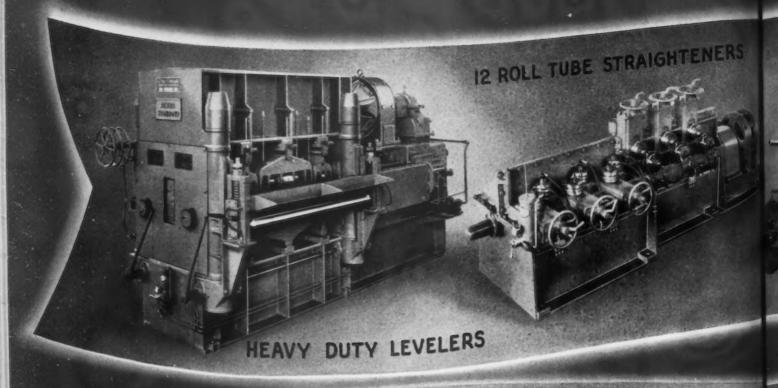
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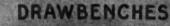
Step-up
Production
with these
HEAVY-BUTY
METAL
SAWING
MACHINES

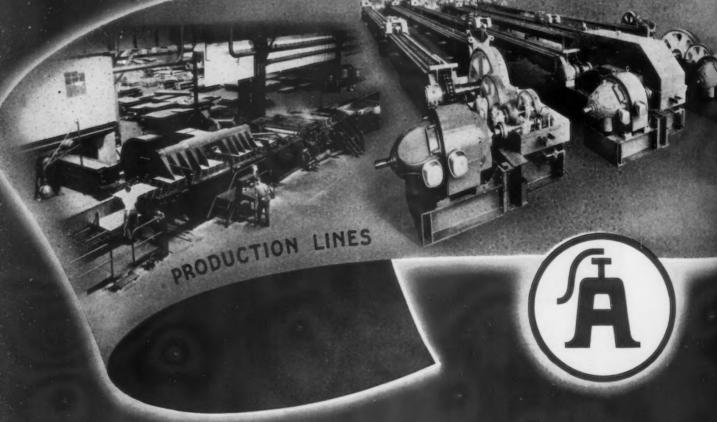
>>

The new design of these machines has resulted in a marked step-up in performance in line with today's demands. With hydraulic feeds and fast cutting speeds, these Espen-Lucas Machines will take heavy cuts—up cutting or down cutting in hard, tough alloy steels.

TO SUPPORT

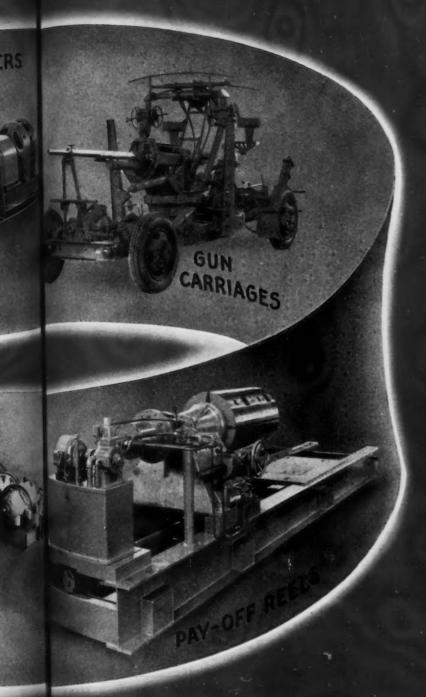






Designers and Builders to the Steel,

IAN IDEAL



ARE WORKING NIGHT AND DAY
TO PRODUCE THE MACHINERY
SO ESSENTIAL TO PROTECT THE
RIGHTS OF DEMOCRACY... AND
WHEN WE ARE AGAIN AT PEACE,
THIS SAME MACHINERY, INTELLIGENTLY DESIGNED AND SOUNDLY
BUILT, WILL DO ITS PART IN REBUILDING A WAR-TORN WORLD

ASSOCIATED COMPANIES

HEAD, WRIGHTSON & COMPANY, LIMITED

TEBOLAGET ARBOGA MEKANISKA VERKSTAD

JOHN INGLIS COMPANY, LIMITED

The AETNA-STANDARD ENGINEERING COMPANY

* YOUNGSTOWN, OHIO, U.S.A.

el, Van-ferrous and Chemical Industries





HOMESTEAD
Protected Seat
The original B. & O. Protected Seat. Eliminates
wire drawing; assures
extra long service, accurate control, extremely
low maintenance.

Thousands of Homestead Protected Seat Operating Valves are used controlling hydraulic presses, furnace doors, manipulators, soaking pit covers, shears, ingot strippers, and dozens of similar jobs in steel and metal working plants the world around. Records of 12 to 18 months' continuous service without so much as the replacement of a fibre disc are common. The reason is simple. Homestead's Protected Seat stops fluid flow before the seat and disk make contact; prevents wire drawing of the seat; practically eliminates shut-downs, reduces maintenance costs, assures fast, accurate control. Made in 3-way and 4-way types, sizes \(\frac{1}{2}\)" to 4", with hand operated or remote control for pressures to 3000 lbs. Investigate before you invest in your next operating valve installation. Consult our engineers about your hydraulic problems. Ask for our catalog No. 38, too.

HOMESTEAD VALVE MFG. CO., P. O. BOX 23, CORAOPOLIS, PA.





BUILT BY Engineering

ROLLING ALUMINUM FOR DEFENSE

● Among the many types of mill equipment built by Morgan, is the above mill consisting of two 22" and two 18" 3-high stands driven by one 22" 3-high and one 18" 3-high pinion stand, for rolling aluminum shapes. With this installation was furnished three oil hydraulic cropping and cutting-off shears to handle up to 5" x 5" aluminum billets. On such equipment for maximum production, the rugged stability of Morgan Engineering is well established, long since proved by the largest producers.

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DESIGNERS - MANUFACTURERS - CONTRACTORS
BLOOMING MILLS - PLATE MILLS - STRUCTURAL MILLS
ELECTRIC TRAVELING CRANES - CHARGING MACHINES
INGOT STRIPPING MACHINES - SOAKING PIT CRANES
ELECTRIC WELDED FABRICATION - LADLE CRANES
STEAM HAMMERS - STEAM HYDRAULIC FORGING
PRESSES - SPECIAL MACHINERY FOR STEEL MILLS
THE MODEAN ENCINEEDING CO. Alliance Obio

THE MORGAN ENGINEERING CO., Alliance, Ohio

THE MORGAN ENGINEERING CO.
ALLIANCE, OHIO Pittsburgh, 1420 Oliver Bldg.

SPIRAL WOUND

► ALK with our engineering representative Cabout your finishing problems. He will gladly work with you in developing Spiral Wound Brushes-of wire, horsehair or tampico-to meet your particular production re-

Pittsburgh Plate Glass Company's Spiral quirements. Wound Brushes pay for themselves-many times over!—in the time and money they save.

Write for further information and for latest

BRUSHES Built to Your Order



BRUSHES FOR EVERY INDUSTRIAL REQUIREMENT



FAST, SMOOTH, SAFE HANDLING OF

ALUMINU

AND OTHER NON-FERROUS AND FERROUS **BARS AND TUBES**

Smooth-flowing bar and tube production at high levels is maintained by Vaugha Draw Senches in the handling of aluminum, just as in drawing the most difficult other allays. Engineered for all-around performance, these powerful units are serving Defense at many vital stations in American industry today.

MACHINERY COMPANY

CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT.. CONTINUOUS OR SINGLE HOLE,. FOR THE LARGEST BARS AND TUBES ... FOR THE SMALLEST WIRE ... FERROUS, NON-FERROUS MATERIALS OR THEIR ALLOYS

ANOTHER MEMBER of the WATERBURY-FARREL

The MOTOR DRIVEN

CHAIN DRAW BENCH

WITH EXTENSION

65 foot draw—
20,000 pound bench—motor drive with push button control—only one operator required—semi automatic unloadings arms—automatic tongs return—50 foot extension with double plug rods, pneumatically operated—power driven string-on rolls.

Available in sizes from 1000 to 100,000 pounds capacity and in any length desired, with or without extension.

MACHINERY FOR FLAT METAL, SHAPES, RODS, TUBES AND WIRE

WATERBURY FARREL
FOUNDRY & MACHINE COMPANY
WATERBURY . CONNECTICUT . U.S.A

VATERBURY FARRI

FOR PEAK DEFENSE PRODUCTION



t

d

r

THE LARGEST TOP-CHARGE ELECTRIC FURNACES IN THE U.S.A.

Increased production for national defense is being handled in Lectromelt equipment. The illustrations show a 17'-0" diameter size "KT" 50 ton capacity Lectromelt furnace on alloy steel production. Similar capacity furnaces are turning out heats of 50 tons of plain carbon steel in other plants. These are the largest top charge furnaces in operation. The top charge type of furnace results in savings in power, electrodes, refractories and man hours. The top charge furnace speeds up production.

Lectromelt furnaces are built in standard sizes from 100 tons down to 25 lbs. capacity—both top charge and door charge types are available.



PITTSBURGH LECTROMELT FURNACE CORP.

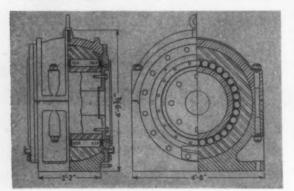
PITTSBURGH, PA.

IN THE NEWS

WITH BANTAM BEARINGS



ENGINEERING ADVANCEMENT for new Chicago project is the use of radial roller bearings in the bascule type bridge now under construction for North State Street. The bridge, a perspective study of which is shown above, will rank among the largest of its kind in the world, with a width of 108 feet and a clear span of 210 feet. Two 36-foot roadways will be provided. Shown at left is cross-



ings, designed and built by Bantam, which will support two sets of three trunnions which in turn will carry the two movable leaves weighing 8,500,000 lbs. each. Self-adigning features, provided by spherical outer races resting in spherical housing seats, will compensate for any possible load deflections that may take place—another example of Bantam's engineering skill in designing anti-friction bearings for new and unusual requirements. Furthermore...

section of one of the large (47½" O.D.) Self-Aligning Roller Bear-

Substantial savings in size of electrical equipment and in power operating costs will be made through the use of Bantam Radial Roller Bearings. Only four 75 HP series motors will be required to operate the bridge, while the lower servicing and maintenance requirements of these bearings will bring additional savings. Bantam Bearings, such as those shown at left, have already been applied with gratifying results in other types of bridges. Breakaway and running loads have been reduced, and spans are moved with greater ease.



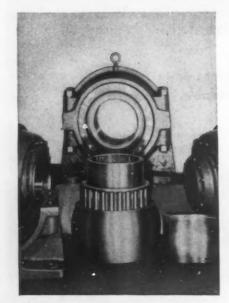
"BIG BRUISER" is this M-3 28-ton tank shown leaving the assembly line of the Chrysler Tank Arsenal. In the transmission, Bantam's Quill Roller Bearings aid in passing the tremendous driving power from motor to tractor treads. Maintaining a prompt, efficient flow of bearings of all types to the assembly lines of industry is Bantam's first job in helping meet the demands of the rapidly increasing production of defense material.



THE MANY ADVANTAGES of Bantam's compact, high capacity Quill Bearing are making it increasingly in demand for defense needs, where dependability and long-time maintenance-free service are primary considerations. A self-retained unit, easily installed and lubricated, it is ideally adapted to production line assembly methods. And its small size permits savings in materials of surrounding parts. For details on this unusual bearing, write for Bulletin M-104.



EVERY MAJOR TYPE OF ANTI-FRICTION BEARING is included in Bantam's line—straight roller, tapered roller, needle, and ball. If you have a difficult bearing problem, TURN TO BANTAM.





BANTAM BEARINGS CORPORATION . SOUTH BEND . INDIANA

Alliance

CRANES AND CHARGERS FOR RECORD-BREAKING PRODUCTION

OPEN HEARTH CHARGING MACHINES

inteions. I lution size ding ring,

(The one illustrated has a capacity of $7\frac{1}{2}$ tons)

LADLE CRANES

GANTRY CRANES

SOAKING PIT CRANES

STRIPPER CRANES

SLAB AND BILLET DRAW-ING MACHINES

UNFALTERING SERVICE

OPERATORS MANIPULATE Alliance cranes and chargers with uncanny accuracy; and record-breaking tonnage is handled smoothly, rapidly and safely. This is not by accident. Alliance engineers carefully survey customers' requirements and properties before commencing construction drawings. With this important research data supported by world-wide experience, they design SPECIAL cranes and chargers which synchronize production with plant facilities. Furthermore, Alliance cranes and chargers operate full time year after year without maintenance difficulties. Compare their ruggedness with the specifications of any others. It's worth-while, we assure you.

THE ALLIANCE MACHINE CO. - ALLIANCE, OHIO



WITH FLEXOMOTIVES*

Operating records in many of the nation's steel mills show that Plymouth Flexomotives are keeping the loads rolling which are so vital to defense. Flexomotives insure the highest efficiency in handling the precious tons of ore and steel. Plant superintendents praise Flexomotive Performance . . . they value the 98% availability; low operating cost; Flexomotive's ruggedness to stand up under 24 hour service, seven days a week. And best of all, they like the way in which the heavy loads are handled . . . smoothly, efficiently and economically.

Plymouth Flexomotives are designed, engineered and built to give top performance under heavy duty. They'll deliver the loads when and where you want them. Let us show you how Flexomotives will lick your toughest haulage problems. Get the record . . . today.

There's a Flexomotive working near you . . .

Ask us about it so you can see this No. 1 performer of the industry in action!

PLYMOUTH LOCOMOTIVE WORKS

Division of THE FATE-ROOT-HEATH CO., Plymouth, Ohio, U. S. A. *Reg. U.S. Pat. Off.

n this Year of Defense, —STAMCO is as eager as ever to serve you.



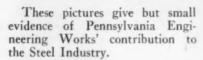
Your problems are our problems. Stamco's "open door" policy gives you the advantage of experience and knowledge gained by more than 55 years of the manufacture and the application of special rolling mill machinery. Just telegraph, telephone or come to Stamco for the correct answer.

The STREINE TOOL & MANUFACTURING COMPANY

CONVERTERS, MIXERS



600-ton Mixer



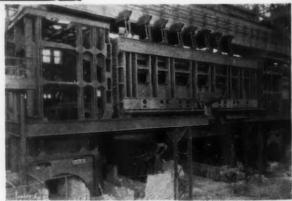
Backed by many years of experience and the great number of installations in the many Steel Plants, the Pennsylvania Engineering Works is prepared to design, fabricate and erect complete Duplex Plants, including Mixers-25 tons to 2000 tons capacity, Open Hearth Furnaces—50 tons to 400 tons capacity-both tilting and stationary, Converters-5 to 50 tons capacity, Converter Jack Cars, Bottom Oven Cars, Regulating Valves, Slag Cars, Ladles, Ladle Cars, Transfer Cars, Jib Cranes and Hauling Systems.



Blowing



Charge in 15-ton Converter



25-ton Converter

Inland Steel Company

Illinois Steel Company

Republic Steel Corporation

Bethlehem Steel Company

Weirton Steel Company

Installations of some of the

illustrated equipment at

Tennessee Coal, Iron & Railroad Co.

Youngstown Sheet & Tube Company

Carnegie-Illinois Steel Corporation

American Steel & Wire Company

Jones & Laughlin Steel Corporation

Broken Hill Proprietary Co., Australia

Compania Siderurgica del Mediterraneo, Spain

Cia, Fundidora de Fierro v Acero, Mexico

Ford Motor Company, River Rouge

Tata Iron & Steel Company, India Algoma Steel Company, Canada Steel Company of Canada, Ltd.

Ford Motor Company, England

400-ton Tilting Open Hearth Furnace

Pennsylvania Engineering Works New Castle, Penna.

1500-ton Mixer

FEW CAN SAY AS MUCH

The William B. Pollock Company is one of the few companice in the United States who can say that they have been able to maintain an outstanding position in their field for over three quarters of a century. The Pollock Company built the small blast furnaces of the early days in iron making, and grew with the iron and steal industry until now they are engineering. fabricating and erecting the largest and most exacting furnaces of the modern steel in-

POLLOCI

The WILLIAM B. POLLOCK COMPANY

YOUNGSTOWN, OHIO

ENGINEERS - FABRICATORS - ERECTORS STEEL PLATE CONSTRUCTION .

OHIO Maximum Lift MAGNETS



A standard 65" Ohio Magnet Lifting 5200 lbs. of Pig Iron

Standard round general purpose Ohio magnets are built in sizes from 12" to 65" in diameter.

Average lifting capacity for pig iron or scrap ranges from 200 lbs. to 6200 lbs.

Depending upon the amount of material to be handled, the largest suitable magnet will do it most economically.

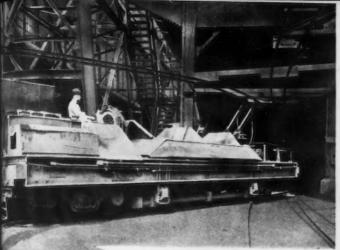
Labor cost per lift is the same whether the lift be 200 lbs. or 6200 lbs.



The OHIO
Electric Mfg. Co.
5908 Maurice Avenue
Cleveland, Ohio

THIS is no time for inaction by manufacturers who have not yet started to produce war essentials.

You can get action by advertising in the Iron Age's Sub-Contracting Section which is published wice a month in the first and third issues. The Sub-Contracting Section is in this issue - - - see pages 528 to 531.





Years After ...

The ATLAS

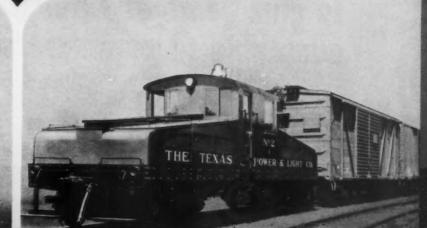
OTR & MANUFACTURING CO.

* CLEVELAND, OHIO, U. S. A. *



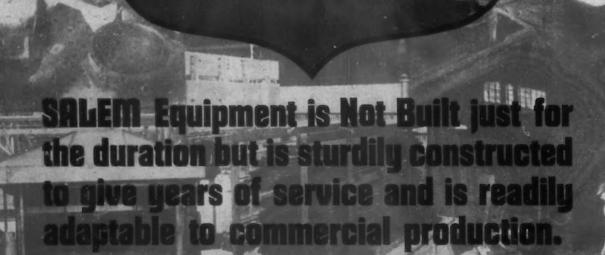






IGINEERS and MANUFACTURERS SINCE 1896

The factors with SALEM



SALEM ENGINEERING CO.

SALEM, OHIO



FOR COLD REDUCTION
AND TEMPER ROLLING

WHERE HARDN S

RESISTS FIRE CRACKING

EXCELLENT GRIPPING QUALITIES

RESISTANCE TO END OR TAIL MARKINGS

RESISTS ORANGE PEEL

SALEM

VEERING



Pittsburgh Rolls are made for every rolling operation and every variety of mill.

BLAW-KNOX CO.—"Steel's Partner" • PITT\$BURGH, PA

ROLLS PITTSBURGH ROLLS DIVISION of



"Red Circle" heat treated Alloy and Plain Chilled Rolls for three and four-high Mills, Sheet and Tin Mills. Moly Rolls, Nickel Chilled, Grain Rolls, Cold Rolls and Sand Rolls.

Sheet and Tin Mill Shears of all kinds. Roll Lathes, Steam Doublers, Sheet Pack Carriers, Stretcher Levellers and Rolling Mill Machinery built to specifications.

Let HYDE PARK Quote on your next requirements.

HYDE PARK FOUNDRY & MACHINE CO.
Hyde Park (Pittsburgh District) Pennsylvania

"NATIONAL" ROLL

EXTRA HARD ALLOY ROLLS FOR BRASS COPPER ALUMINUM ZINC



SPECIAL WORK ROLLS FOR FOUR-HIGH MILLS

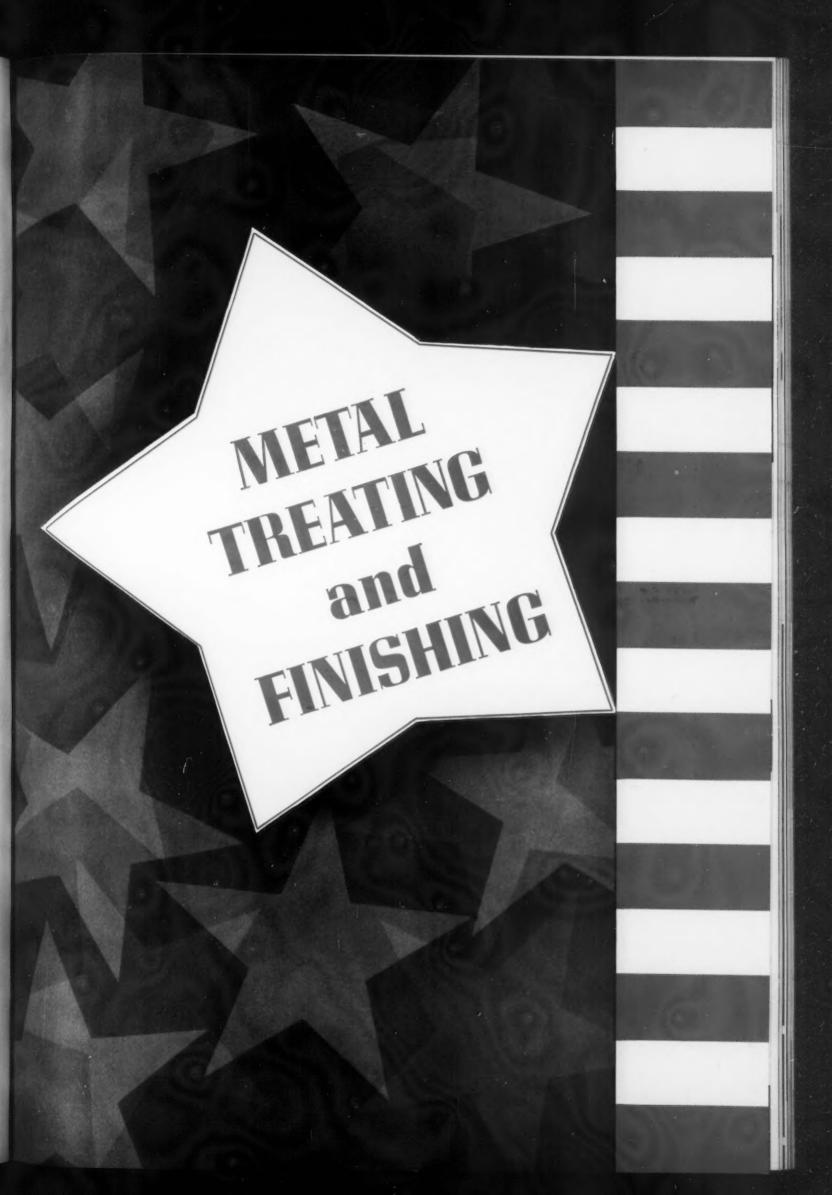
WE SPECIALIZE IN

Rolling Mill Machinery

Plain
Chilled Rolls
Cold Rolls
Cold Rolls
Cold Rolls

The National Roll & Foundry Co.

Office and Works: AVONMORE, PA., U. S. A.



GIVE US STEEL!

Continuous Normalizing Furnace for Plates

Continuous Radiant Tube Strip Annealing

Sattery of One-Way Fired Soaking Pits

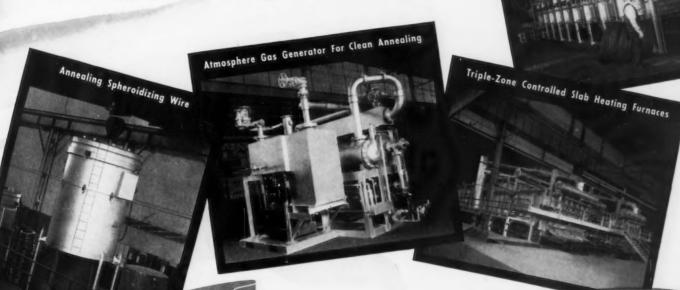
Beginning with the soaking pit there is an SC furnace for every steel mill operation. Shown on these pages are but a few installations of the more common types. To meet the demands of Defense Production Surface Combustion nas, during the past year, designed and installed many special type furnaces.

Radiant Tube Cover For Strip

SURFACE

THE URGENT CRY OF DEFENSE

...and Surface Combustion Equipment is aiding the Nation's Steel Mills in meeting this Emergency Demand



■ Tanks, planes, heavy artillery, anti-aircraft guns, shells, mechanized transports, jeep cars, swift torpedo boats and ponderous supply ships—these are the sinews of Defense. They call for steel . . . steel . . . AND STILL MORE STEEL!

The steel industry is doing everything humanly possible to satisfy this urgent demand. It is estimated that during 1941 the industry produced close to 80,000,000 tons of steel, or 35 per cent more than the combined capacity of the Axis and Axisdominated countries. This is 167 per cent more than produced in 1938 and 60 per cent more than produced in the World War record year of 1917.

Surface Combustion is proud of the part it has been privileged to play in helping the steel industry meet this all important demand. SC soaking pits, slab furnaces, normalizing furnaces, annealing and spheroidizing furnaces, armor plate and scores of other types of Surface Combustion furnaces are on the job helping to produce steel...day and night, in most of the leading steel mills.

Refractory Bed Burner Wire Patenting Furnace

To take care of the unprecedented demand for SC steel treating furnaces, it has been necessary to expand our facilities and increase our personnel repeatedly... at present, our business is 98 per cent Defense. For the duration of the Emergency, Surface Combustion will continue to devote its all-out effort to the building of equipment for Defense... as rapidly as is humanly possible without sacrificing the high qualities which have come to be associated with Surface Combustion equipment.

SURFACE COMBUSTION CORPORATION . TOLEDO, OHIO





B&W INSULATING FIREBRICK ... designed for long, hard service

The long and satisfactory service life of B&W Insulating Firebrick is due in great part to the reserve strength that is an inherent characteristic of these brick. Not just cold crushing strength...but far more important...HOT LOAD STRENGTH—strength in a furnace when it is operating

at maximum output.

Of importance, too, is the extreme light weight of these brick — an indication of their excellent thermal characteristics.

Full details are given in Bulletin R-2-G which will be gladly sent on request.

THE BABCOCK & WILCOX COMPANY · Refractories Division · 85 LIBERTY ST., NEW YORK, N.Y.

R-143

BABCOCK & WILCOX



together face this emergency

DAYS LIKE THESE ARE TOUGH ON EVERYBODY -- We are all faced with new manufacturing problems and stepped-up production for Gov. ernment orders which won't allow time for experimentation, yet all completed products must be right, finished according to specifications.

NEW PRODUCTS FROM NEW METALS NEED NEW PROCESSES... In most cases your old formula won't work on today's strange metals. However, a MacDermid metal finishing specialist, when consulted, can demonstrate a proven formula, perfected for that particular metal and together you can determine the best way to adapt it to your use—producing a chemically and metallurgically cleaned product, freed from all inorganic surface dirts, readied for inspection.



* Special Processes and COMPOUNDS for CLEANING Basis Metals

SALES AND SERVICE COAST TO COAST

New York . . . Cleveland Los Angeles . . . Chicago Newark . . . Detroit . . . St. Louis Philadelphia . . . Toronto, Can.

WATERBURY . CONNECTICUT



EVER

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Hay: We are not this slow!

Remarkably fast deliveries on North American Burners, Mixers, Regulators, Valves and Accessories.

If you are looking for dependable Combustion Equipment in a hurry, we invite you to try

Combustion Equipment by

NORTH AMERICAN

THE NORTH AMERICAN MANUFACTURING COMPANY MANUFACTURERS OF INDUSTRIAL FUEL BURNING EQUIPMENT FOR GAS OR OIL CLEVELAND, OHIO

BRANCH OFFICES WITH FACTORY TRAINED REPRESENTATIVES IN PRINCIPAL CITIES

THUMBS UP" Por 1942

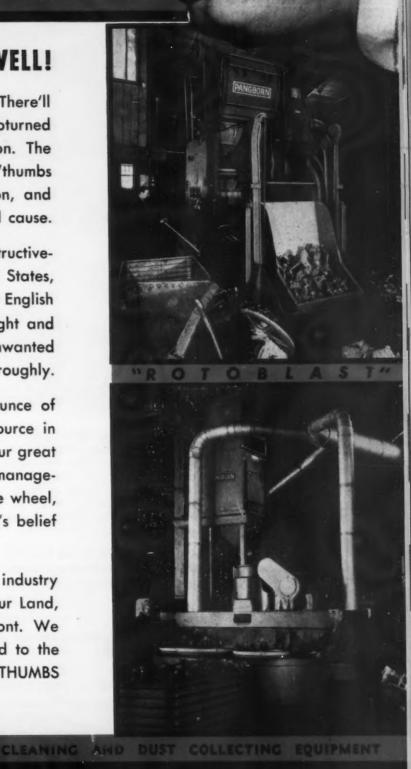
EVERYONE MUST DO HIS PART WELL!

The British have a stirring slogan for this war. "There'll ALWAYS be an England" are the words—and the upturned thumb gives dramatic significance to their declaration. The R.A.F., the Navy, the Tank Corps, all accept the "thumbs up" salute as a pledge of courage, determination, and unlimited sacrifice—even to life itself—for a sacred cause.

Now that the black cloud of war has unleashed destructiveness upon the property and people of the United States, let us accept the "thumbs up" determination of the English people as our pledge for 1942. With all our might and main let's work together, feverishly, to get our unwanted and unsought job over successfully, quickly and thoroughly.

Here is how we all feel at Pangborn's. Every ounce of manpower, every measure of strength, every resource in this fine plant of ours is placed at the disposal of our great government. We shall work together, men and management, day and night, each with our shoulder to the wheel, theerfully, that the absolute justice of Democracy's belief may prevail to a certain victorious end.

We are rightly proud that our equipment helps industry grow stronger by the hour. We are PROUD of our Land, our Country, and our brave fighting sons at the Front. We stand solid behind them. With all our hearts and to the limits of our endurance we pledge 100 per cent "THUMBS" mobilization for 1942!



MLD'S LARGEST MANUFACTURERS OF BLAST CLEANING

PANCBORN

NGBORN CORPORATION

HAGERSTOWN, MD.



As leaders in advanced engineering and product styling, as well as in producing equipment for defense, the automotive industry is now pointing the way to greater conservation of defense materials. Without sacrificing either beauty or utility, new finishing methods for various parts are developed that will release chromium, tin, zinc and cadmium to our defense needs.

With Bonderizing as a rust-inhibiting base for decorative enamels, that replace plated units; with Parkerizing for protection from rust on exposed parts; with Parco Lubrizing as an oil retaining coating for friction surfaces, Parker Processes are filling a vital need in the automotive and other industries, without sacrificing either appearance or protective efficiency.

Books describing these processes, where they are used and how they are applied are available to factory officials and technical men. Send for copies.

PARKER RUST PROOF COMPANY 2186 E. Milwaukee Ave. • Detroit, Michigan



PARKERIZING

A finish and substantial protection from rust on bolts, screws and small mechanical parts.



BONDERIZING

A rust inhibiting paint base that bonds the finish to sheet metal surfaces.



PARCO LUBRIZING

A chemically produced coating for friction surfaces that retains oil and prevents metal to metal contact.

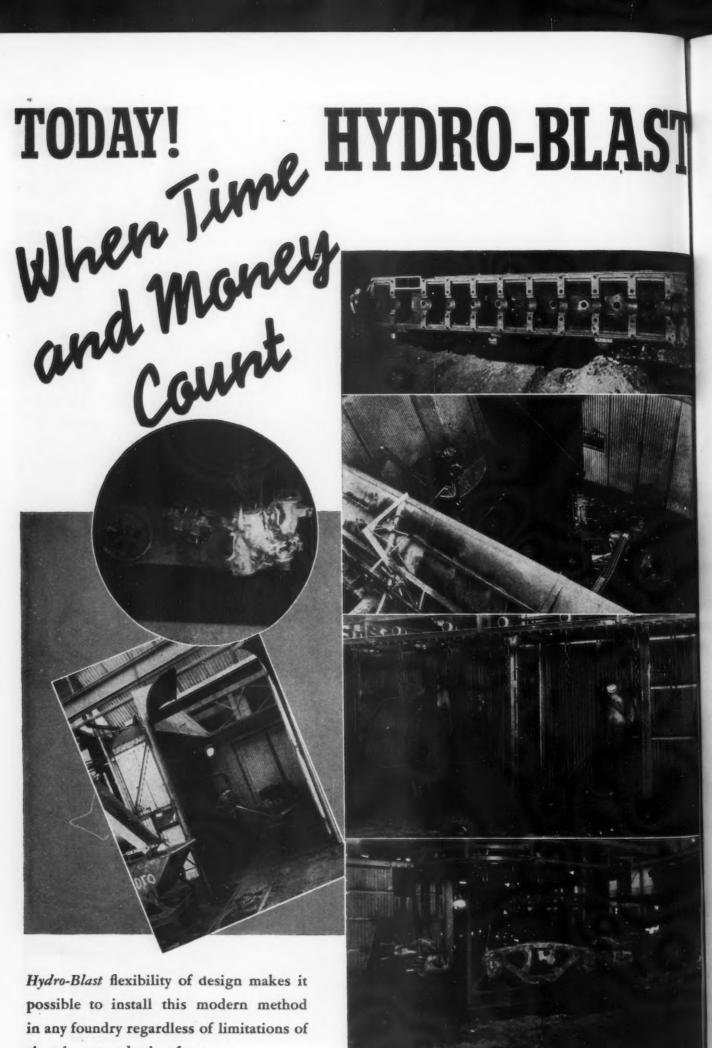




THE IRON AGE, January 1, 1942-325



Hydro-Blast flexibility of design makes it possible to install this modern method in any foundry regardless of limitations of shop layout and other factors.



Cleans Castings Faster and Better

FROM 2 OUNCES TO 200,000 POUNDS

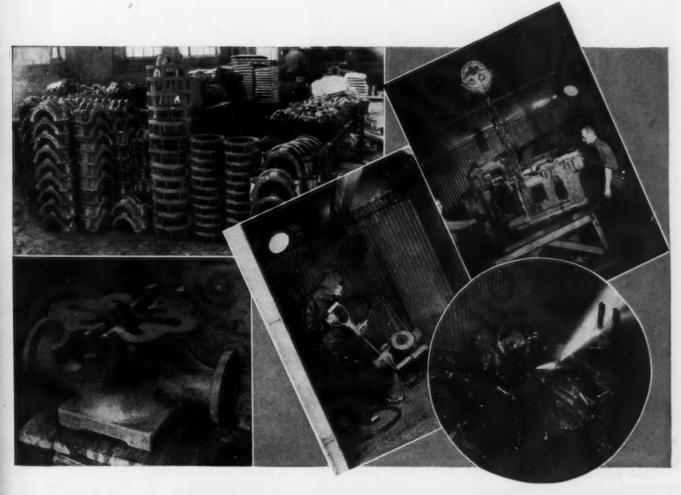
Magnesium . . . Brass . . . Aluminum . . . Gray Iron . . . Steel

Today! Hydro-Blast is decoring and cleaning the widest variety of castings without creating dust; in all kinds of foundries; large and small, jobbing and production.

Hydro-Blast installations may be designed for cleaning castings only; for cleaning the casting, washing and recovering the core sand in a dewatered condition; for performing all those functions, plus drying the sand to a predetermined moisture content.

These essential operations are performed in a fraction of the previously required time. In many instances economies are so substantial as to return the investment in Hydro-Blast during the first twelve months of operation.

Hydro-Blast is proving every day—now, when time and money count—that it is the foundry's most economical method for cleaning castings of all kinds and sizes—in jobbing and production shops.



The HYDRO-BLAST Corporation

Dustless Core Removal · Surface Cleaning · Sand Recovery
3118 CLYBOURN AVENUE · CHICAGO, ILLINOIS

The Corrosion Resistant Lining Material



• High resistance to the destructive action of corrosive materials, including hydrofluoric acid and caustic alkalies. and ability to withstand severe thermal shock, lead to extensive use of carbon and graphite brick and structural shapes as linings for pickling tanks and other processing equipment. Experience has proved the economy of carbon and graphite linings in the presence of corrosive materials.

Corrosive waste liquids can be effectively handled in sump tanks lined with carbon or graphite brick. Temperature differential between waste materials run into the tank does not endanger the lining when carbon or graphite is used. Latent heat in hot corrosive waste can be effectively recovered by the use of heat exchangers made of graphite pipe.

This background is the machined surface of one of the several grades of "National" carbon materials.

CARBON MOLD PLUGS



offer economies when used in steel ingot molds. They eliminate ceramic inclusions and prevent sticking of plug to ingot. Each plug is good for several pourings. Sizes other than standard can be made to purchaser's order.

STANDARD SIZES

5 H" to 5 1/4" diameter by 3" long 51/8" to 51/8" diameter by 3" long

Write for information on the use of carbon or graphite products to solve your difficulties arising from corrosion or severe thermal shock

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation UCE

Carbon Sales Division: Cleveland, Ohio

GENERAL OFFICES 30 East 42nd Street, New York, N. Y.

BRANCH SALES OFFICES New York, Pittsburgh, Chicago, St. Louis, San Francisco

328-THE IRON AGE, January 1, 1942

The word "National" is a trade-mark of National Carbon Company, Inc.

IT'S DREVER FOR CAR TYPE FURNACES



EXPERIENCE POINTS TO



Furnaces for Bright Annealing Stainless Steel . . . Roller Hearth Furnaces for Armor Plate . . . Ammonia Dissociation Equipment . Specialty Furnaces for a wide variety of applications . . .

THE DREVER CO.

780 E. VENANGO ST. PHILADELPHIA, PA.

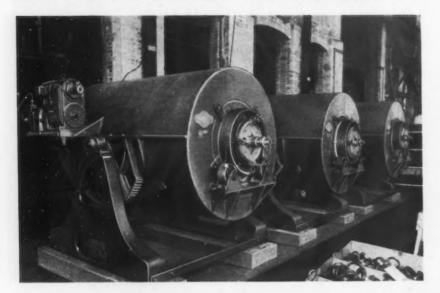


Assessing Stainless Street, Bulletin B-S — Assessing Microsofiction Equipment

. Designers and Builders of Specialty Furnaces

GAS CARBURIZING — — THE MODERN WAY

IN A.G.F. BATCH ROTARIES



Where the work may be rotated slowly, it is highly advantageous because the resultant mixing assures a uniformly heated product even on small tightly nested parts and the gaseous carburizing medium comes into contact with every surface of every part, giving a highly uniform case.

Charging and Discharging labor is reduced to a minimum by the tilting feature.

IN A. G. F. VERTICALS

The Retort and its cover with automatic seal are entirely enclosed in this type of Furnace, assuring temperature uniformity of a high order and marked improvement in the uniformity of carburizing.

Verticals are used for parts which may not be tumbled, such as gears, shafts, etc. They may also be used for other Heat Treating processes including normalizing, nitriding, annealing, or hardening—all under CONTROLLED ATMOSPHERE.

In A. G. F. Continuous Rotaries

For the continuous carburizing of small parts such as self tapping screws, etc., requiring a thin case only, these machines are especially desirable.

The work is advanced through the retort by a peripheral spiral in the retort. The retort stays within the heat at all times which results in high thermal efficiency and long retort life. Rotation keeps soot from forming on the work and aids in giving uniform carburizing.



AMERICAN GAS FURNACE CO.

ELIZABETH, NEW JERSEY



THE **RIGHT** BRICK for EVERY TEMPERATURE ... for EVERY SERVICE

Listed below are details on the properties of the new complete line of J-M Insulating Brick and Insulating Fire Brick. Each is designed for a specific temperature and service... can be relied upon for continued efficiency and economy. For further details, write Johns-Manville, 22 East 40th Street, New York, N. Y.

	SIL O CEL C 22 INSULATING BRICK G Up-2000 F B	SIL O. CEL SUPER INSULATING BRICK ack Up=2500 F	IM lo INSULATING FIBL BRICK Bark Up=2000 F: Exposed=1000 F	IM 20 INSULATING FIRE BRICK Back Up-2000 F Exposed-2000 F		FIRE BRI	CK OO F
Properties	X ,	×	X	×	×	×	×
Density—Ib. per cu. ft.	30	38	40	22	31	38	44
Transverse Strength— lb. per sq. in.	140	115	90	70	100	135	150
Cold Crushing Strength— lb. per sq. in.	400	700	300	70	125	170	165
Linear Shrinkage—%	1.4 @ 1600° F	0.8 @ 2000° F	2.0 @ 2500° F	0.0 @ 2000° F	0.0 @ 2000° F	0.0 @ 2300° F	0.5 @ 2600° F
Reversible Thermal Expansion—Percent	0.1 @ 1600° F	0.7 @ 2000° F	1.29 @ 2000° F	0.5—0.6 @ 2000° F	0.5—0.6 @ 2000° F	0.5—0.6 @ 2000° F	0.50.6 @ 2000° F
Conductivity at Mean Temperature 500° F 1000° F 1500° F 2000° F	11 1 1.01 .67 1.13 .79 1.24 .90	1.67 1.88 2.08	1.70 1.95 2.19 2.45	.75 1.01 1.41	1.01 1.19 1.49 1.91	1.26 1.49 2.05 3.37	1.61 1.90 2.61 4.29
Recommended Service Back Up Exposed	1600° F	2000° F	2500° F	2000° F 1600° F	2000° F 2000° F	2300° F 2300° F	2600° F 2600° F
Recommended Mortar for Setting Brick	Sil-O-Cel Mortar	Sil-O-Cel Mortar	Sil-O-Cel Super Brick Mortar	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement	J-M No. 1626 Cement

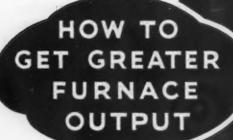
Note:- I. Above tests are in accordance with ASTM tentative standards.

2. Conductivity is expressed in Btu. in. per hr. per sq. ft. deg. F. at the designated mean temperatures.

3. | |-with heat flow parallel to brick strata.

i —with heat flow perpendicular to brick strata.





Set index to desired starting temperature.

Set Soaking Temperature Switch at desired holding temperature.

Set "Rate Control" at desired degrees per hour.

Set "Soaking Time Control" at desired time in a hours and minutes.

Upon completion of program, fuel will be shut off and/or signal given.

IN the manufacture of aircraft parts at the Kellett Autogiro Corporation, Philadelphia, Time and Temperature are important factors in producing desired results.

The Brown Program Potentiometer Controller, shown above, automatically raises, holds or lowers temperatures according to a predetermined Time-Cycle Control schedule. This is accomplished by a timer mechanism operating a motor-driven control index in the instrument. By virtue of the Timer-Control index combination, program flexibility is almost unlimited. The operator merely sets the dials, as in a radio, and fixed cams, etc., are eliminated.

To the steel treater who appreciates the importance of accurate temperature measurement and positive control of furnace operation. Brown Potentiometer Controllers offer worthwhile advantages. They help to speed

up and maintain manufacturing schedules along predetermined lines of increased production, standardized quality and lower costs.

They are designed to work singly or in complete coordination for the control of a single factor or complete control of an entire process. They are supplied for controlling any type of furnace...oil, gas or electric. You'll find Brown Instruments everywhere, on all makes of furnaces, used for every kind of work where closely held temperature is essential to "all out" production.

Write for Bulletin 85-17. THE BROWN IN-STRUMENT COMPANY, 4483 Wayne Ave., Philadelphia, Pa. Offices in all principal cities. Amsterdam-C, Holland: Wijdesteeg 4—England: Wadsworth Road, Perivale, Middlesex—Stockholm, Sweden: Nybrokajen 7.

Brown Potentiometer Controllers

CIONI OF MINISTER POLICY FIRM THE PROJECT AND COLOR AND

DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR CO.

MINNEAPOLIS, MINNESOTA, AND 119 PETER STREET, TORONTO, CANADA

TO MEASURE AND CONTROL IS TO ECONOMIZE

FURNACES THAT SAY IT WITH

DRODUGTION

In the heat treatment of shells and other defense products, Rockwell Furnaces speak for themselves. Here are several of the many types that say it—convincingly — in terms of production.

18,000 LBS. PER HOUR

This Gas Fired Roller Hearth Annealing Furnace handles cartridge brass slabs. Construction is unusually rugged—the rolls are extremely heavy, and the drive and all other parts are capable of this extreme production rate. Driven rolls carry the slabs from the charging table through preheating, heating and cooling sections, and on the discharge table to the dump mechanism.

3,000 LBS. PER HOUR

A Gas Fired Revolving Annealing Furnace, (Retort Type) that is a complete unit for washing, annealing and pickling 50 caliber brass cartridge cups in a continuous, even stream. A great producer, it is also exceptionally economical from the standpoint of labor, fuel and in the use of acid.

70 SHELLS (4.5") PER HOUR

A Revolving Hearth Type Shell Nosing Furnace with openings around its outside circumference for receiving the shells. Heating is so controlled that no distortion occurs below the taper during the press operation. Charging and discharging from the same position requires only one operator—shells being sent to him on a conveyor. The absence of a water-cooled chill results in a great saving of fuel.

Because of standards already established, time-saving deliveries can be made on many types of Rockwell Furnaces that will step up your production. What is your heat treating problem?

W. S. ROCKWELL COMPANY



NEW YORK, N. Y.

For more rust protection * * * per dollar - you need * * * HOT DIP GALVANIZING



Because Hot Dip Galvanizing provides a thicker coating of zinc . . . because Hot Dip Galvanizing fuses the zinc into the metal beneath and makes this heavier coating an inseparable part of the product . . . because the laws of chemistry do not change, you can be sure that genuine Hot Dip Galvanizing will certainly give you greater rust protection per dollar . . . This is why

National Defense requires Hot Dip Galvanizing on so many things . . . This is why so many companies demand that all their galvanizing work be done by members of this association . . . Write for literature and learn the facts about rust prevention and galvanizing.

AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC.

American Bank Building · Pittsburgh, Pennsylvania

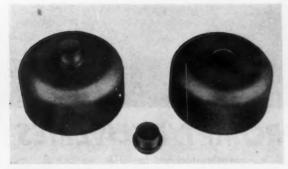
IF IT CARRIES THIS SEAL IT'S A JOB WELL DONE

Acme Galvanizing, Inc., Milwaukee, Wis. * Acme Steel & Malleable Iron Works, Buffalo, N.Y. * American Tinning & Galvanizing Co., Erie, Pa. * Atlantic Stamping Co., Rochester, N.Y. * Atlantic Steel Co., Atlanta, Ga. * Buffalo Galvanizing & Tinning Works, Inc., Buffalo, N.Y. * Diamond Expansion Bolt Co., Inc., Garwood, N.J. * Equipment Steel Products Division of Union Asbestos and Rubber Co., Blue Island, Ill. * The Fanner Mig. Co., Cleveland, O. * John Finn Metal Works, San Francisco, Cal. * Galvanizers Incorporated, Portland, Oregon * Thomas Gregory Galvanizing Works, Maspeth, N.Y. * Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa. * Thomas Gregory Galvanizing Works, Maspeth, N.Y. * Hanlon-Gregory Galvanizing Co., Pittsburgh, Pa. * James Hill Mig. Co., Providence, R.I. * Hubbard & Co., Oakland, Cal. * Independent Galvanizing Company, Newark, N.J. * International-Stacey Corp., Columbus, O. * Isaacson Iron Works, Seattle, Wash. * Joslyn Co. of California, Los Angeles, Cal. * Joslyn Mig. & Supply Co., Chicago, Ill. * L.O. Koven & Brother, Inc., Jersey City, N. J. * Lehigh Structural Steel Co., Allentown, Pa. * Lewis Bolt & Nut Co., Minneapolis, Minn. * Missouri Rolling Mill Corp., St. Louis, Mo. * The National Telephone Supply Co., Cleveland, O. * Penn Galvanizing Co., Philadelphia, Pa. * Riverside Foundry & Galvanizing Co., Kalenazoo, Mich. * San Francisco Galvanizing Works, San Francisco, Cal. * The Sanitary Tinning Co., Cleveland, O. * Standard Galvanizing Co., Chicago, Ill. * Wilcox, Crittenden & Company, Inc., Middletown, Conn. * The Witt Cornice Company, Cincinnati, Ohio



ELECTRIC FURNACE BRAZING

cut costs similarly for YOU?



FORMERLY DRAWN, this fan housing is now electric furnace-brazed at a saving of $14\frac{1}{2}\%$.



FORMERLY DROP-FORGED, this rocker arm costs 14% less to produce by electric furnace brazing.



FORMERLY CAST—now electric furnace-brazed, this tank spud with 2 gas-tight brazed joints costs 32% less.



FORMERLY MACHINED, this nozzle is now produced with four electric furnace-brazed joints at a saving of 25%.

Are you using—or producing—expensive castings or machined parts which electric furnace brazing could produce cheaper and better?

This cost-reducing process offers surprising advantages in unexpected places . . . in producing built-up structures at lower cost in place of screw-machine parts, forgings or drawn products . . . in joining metal parts more accurately,

cheaply and in quantity.

Where and how you may be able to use electric furnace brazing to advantage is explained in a new helpful and informative Westinghouse booklet just off the press. Write for free copy without obligation. Ask for B-3019. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Dept. 7-N.

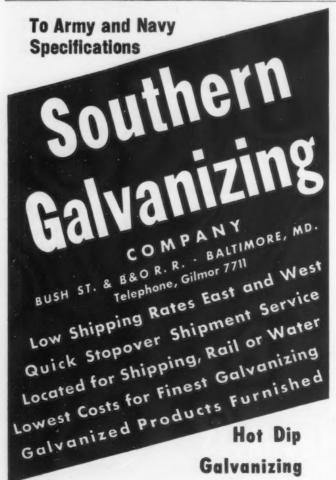
J-10204

Westinghouse ELECTRIC BRAZING FURNACES



QUALITY HOT DIP GALVANIZING







JETAL, the original patented method, is guaranteed to surpass any other method of blackening iron and steel in

-SPEED

—WEAR RESISTANCE
—ECONOMY

JETAL meets all specifications for a black oxide coating. With Jetoil, it withstands 50 hours' salt spray test.

Immediate delivery, any quantity. Samples and consultation service without obligation.

ALROSE CHEMICAL CO.

PROVIDENCE, R. I.

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BLACK-MAGIC

and its associated products cover the field of
Metal Blackina

STEEL, IRON, BRASS, COPPER, BRONZE, ZINC

BLACK-MAGIC low temperature bath cuts by one half the cost of most other processes for blacking steel.

BLACK-MAGIC has developed a low temperature bath for blacking Bronze, Copper and Brass Castings.

BLACK-MAGIC has developed a bath operating at room temperature for blacking zinc die castings.

BLACK-MAGIC has developed and perfected Magic-Etch, a dull or Military finish that eliminates sand blasting and produces a no-glint surface.

BLACK-MAGIC has developed a bath for blacking cast iron.

AND BLACK-MAGIC has developed "Witch-Dip," a hard drying instantaneous finish that is rust-resisting beyond other processes.

BLACK-MAGIC is government approved—it is doing its bit in the Defense Program coloring guns, small arms, Tank and Motorized equipment, Airplane parts, chemical warfare items, uniform buckles, buttons, clasps, harness equipment.

AND BLACK-MAGIC is available for Non-Defense industries. (No restrictions)

Plating is out-Blacking is in.

Write for the BLACK-MAGIC portfolio containing full information.

THE MITCHELL-BRADFORD CHEMICAL CO. BRIDGEPORT, CONN.





In polishing steel sheets
CUTTING-POWER
IS A "MUST"

Polishing stainless steel sheets to a smooth, mirror-like finish is a tough job. It takes the best coated abrasive you can get. That's why so many experienced mill men are insisting on handling this work with Clover. They must be sure,—because here coated abrasive cutting-power is a "must".

Firmly embedded in the tough, durable Clover backing, Clover abrasive grains have "what it takes" to stand the high speeds encountered. They cut clean, smooth, fast. Of uniform size, uniformly distributed, they are packed with Clover's famous super-cutting power.

Put your polishing, finishing and grinding problems up to Clover,—and play safe. Clover Mfg. Co., Norwalk, Conn.

MANY ABRASIVES . . .
ONE PERFORMANCE, THE FINEST

Clover Coated Abrasives are supplied as sheets, rolls, belts, discs, sleeves and other shapes; in Aluminum Oxide, Silicon Carbide, Emery, Garnet and Flint; in paper, cloth and combination backings. Also Clover Lapping Compound, the original and genuine, in the famous Green Can.



STANDARD OF ABRASIVE # PERFORMANCE SINCE 1903

338—THE IRON AGE, January 1, 1942

Are You Seeking SUB-CONTRACT WORK?

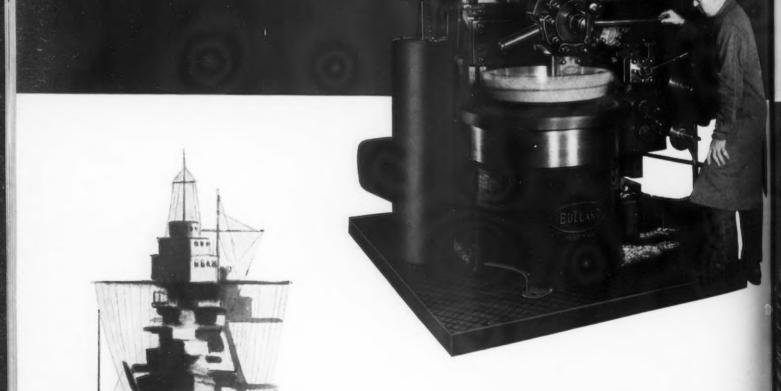
The short-cut way to get it is to advertise in The Iron Age's Sub-Contracting section—see pages 528-531 in this issue.

Recently an advertiser in that section wrote us that as a result of advertisements in The Iron Age he had filled his plant with work.

MACHINE TOOLS
and SMALL
and TOOLS

On The Sea...

Exerty shippard and eavel base has the completed for of failland Vertical Turner Lather, backing for livered and thousands of laterate and accurate parts that keep our ships always ready for action. Bullard machines known have and always will meet the most exceeding standards of accuracy and reliability.



BULLARD

In The Air...



THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

550 MUTAU: MATIC JOBS IN OME PLANT!

That's the task handled by 108 Mult-Au-Matics in just one huge plant. Each of these machines has five or more jobs assigned to it, and the plant manager tells us that tooling is so flexible that changeover from one job to another on any machine can be accomplished in only three or four hours.

The facts speak for themselves. Mult-Au-Matics and the Mult-Au-Matic method are without a peer in modern production practice.





That's the task handled by 108 Mult-Au-Matics in just one huge plant. Each of these machines has five or more jobs assigned to it, and the plant manager tells us that tooling is so flexible that changeover from one job to another on any machine can be accomplished in only three or four hours.

The facts speak for themselves. Mult-Au-Matics and the Mult-Au-Matic method are without a peer in modern production practice.

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT



LET PEERLESS SAWS HELP YOU MAKE '42 AN "ALL-OUT" PRODUCTION YEAR!

PERFORMANCE REPORT "A"

Cutting SAE, X1335, $5\frac{1}{2}$ " x $5\frac{1}{2}$ " Billets for 155 mm shell forgings in a large drop forge plant*. After cutting accurately to 15" lengths the shell stock is forged in a rotating type, gas and oil fired furnace. Seven 14" x 14" Peerless High Duty Hydraulic Saws are used. 1500 to 2000 sq. in. are cut with a single blade. *Name on request.

There needn't be any bottle-necks in your production program when it comes to sawing metal. Peerless Saws speed up metal cutting the safe, accurate way.

Billets . . . tool steel . . . tubes . . . aluminum . . . stainless . . . rounds or squares, in fact any shape, any analysis can be cut at higher speed and with maximum safety for the operator, the material, and the machine when the Saw is a Peerless.

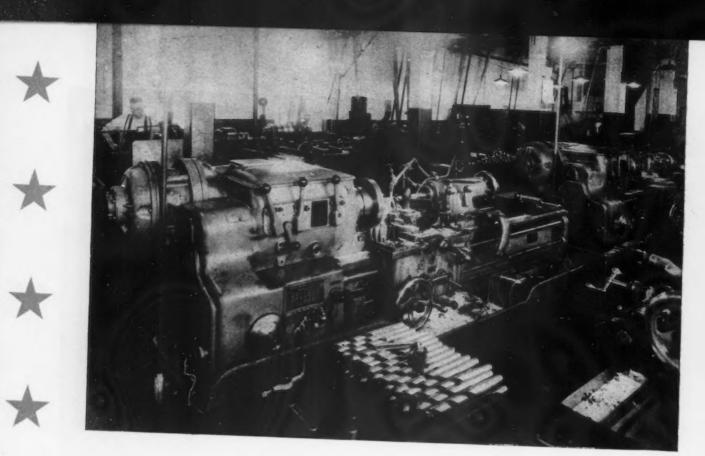
Peerless is the only saw with a Four-Sided Saw Frame — the frame that completely surrounds the blade and the work . . . holds the blade with a tension and rigidity never before possible . . . prevents bowing . . . permits blade to lift and to clear on every return stroke . . . and thereby lengthens blade life.

Get the facts on the entire Peerless line - use the coupon below.

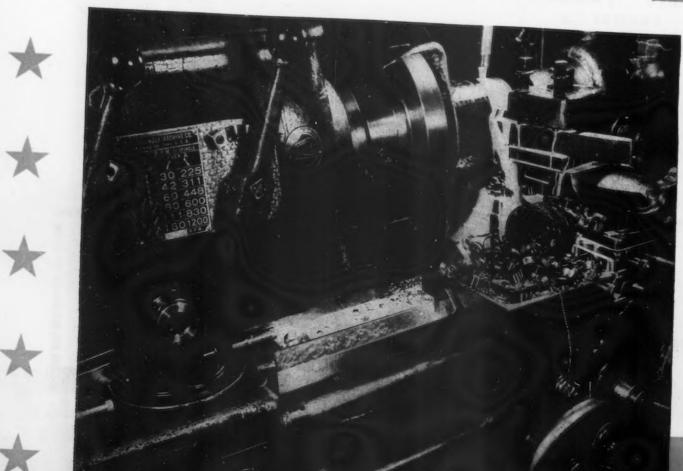
PEERLESS MACHINE COMPANY . RACINE, WISCONSIN

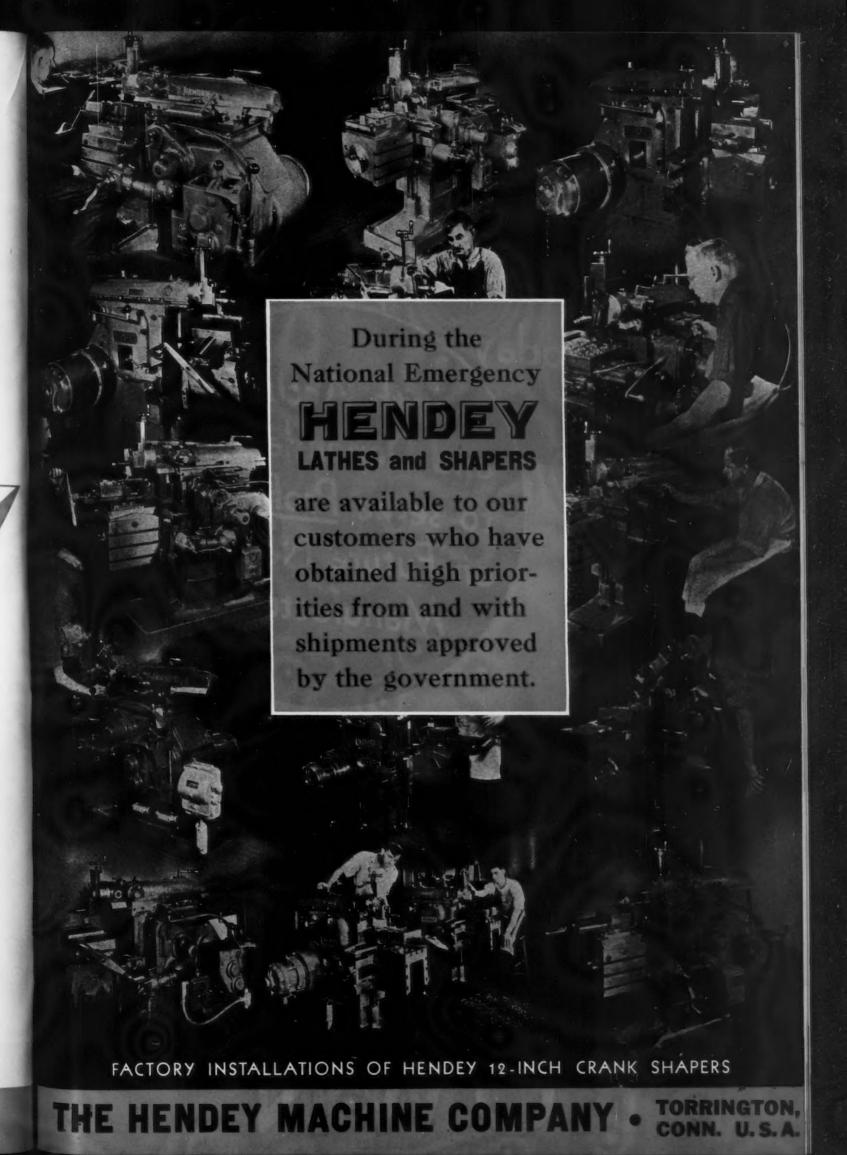
PEERLESS MACHINE COMPANY, Dept. IA-142, Racine, Wisconsin
Mail cutting time estimate for.

| Mail catalog on Hydraulic type Saw for High Production Cutting
| Mail catalog overing Vertical type used for Die Black Work
| Mail catalog on Mechanical type used for Die Black Work
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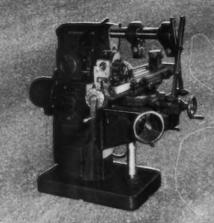


HENDEY





For Urgent
National Defense
Production
...Today



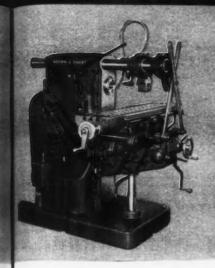
.. with Accuracy and Dependability to serve Profitably on Future Needs in Manufacturing

Outstanding machines — notable for quiet and smooth operation • fast, safe control • and many other features giving high production and accuracy. Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.



BROWN

3







MILLING MACHINES

Universal — Plain — Vertical — Manufacturing

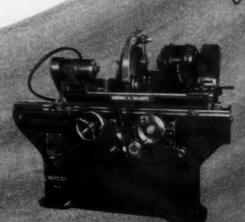
GRINDING MACHINES

Universal — Plain — Surface — Tool

SCREW MACHINES

Automatic —Wire Feed

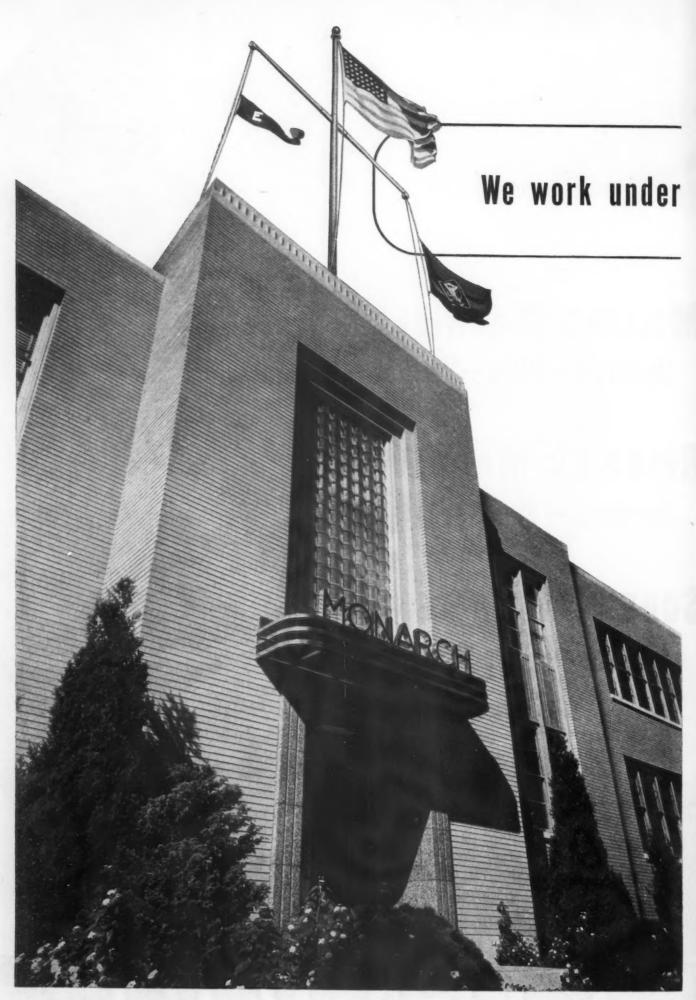






BS

SHARPE



348-THE IRON AGE, January 1, 1942

these flags with a new sense of duty

ľ



When we were awarded the flag of the U. S. Navy Bureau of Ordnance and the Navy "E" Pennant, we at Monarch were proud and thrilled with the honor.

But, as we work with these flags flying above us, we realize that with this recognition come a new obligation, a new duty.

That is-to continue to merit the confidence placed in us.

During 1941, we doubled our production of lathes over 1940. This was five times greater than in 1939, ten times that of 1929. We are proud of these accomplishments, but not satisfied with them.

We realize that to win this war, we at Monarch must more than ever keep everlastingly at it, working with other industries and plants to supply the tools and equipment needed by our Navy and Army and our allies.

Further — we realize that we must continue to earn our "EXCELLENT" rating not alone by the *quantity* of our production, but also by maintaining Monarch's high standards of *quality*, so essential to satisfactory performance under extreme emergency demands.

To the fulfillment of these obligations we pledge our personnel and our plant facilities "for the duration."

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO



The Davis & Thompson Multimill

A compact, high speed, accurate machine tool for plunge cut; straddle mill and similar work

Versatile — built with many unusual features of automatic control and performance — the Davis & Thompson Multimill is another example of specialized development of high production machinery by Davis & Thompson Co.

The cycle of operations includes: with table in low or down position, work is loaded into fixture and start button pressed. Table now rapidly advances by hydraulic means to a predetermined point, contacting a limit switch and slowing down to a predetermined feed. At this point cutters contact work which is automatically fed through cutting area. Limit of table travel is 8 inches.

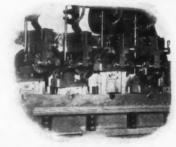
When table reaches end of cut, contact with return limit switch returns table to loading position where it is stopped by another limit switch... Separate pumps operate the independent tables in this machine; fixtures, as required by the work, may be either hand or automatically operated... Individually controlled motors, control switches for each station, a master switch for the entire machine — provide positive, flexible control.

Placed at an angle of 37½°, the heads of the Davis & Thompson Multimill facilitate loading and provide ample space for the work—work can overhang table without interfering with next station. Tables have micrometer adjustments, fixture can be moved relative to cutter, spindle has 2½ inch lateral adjustment.

Machine is ball bearing equipped throughout including Timken Bearing spindles. Write for complete information on this and the entire Davis & Thompson Rotomatic line.

DAVIS & THOMPSON COMPANY Milwaukee, Wis., U. S. A.

Showing close-up of fixtures. Eight inch diameter cutters or a 6 inch wide form cutter can be accommodated. Slides of table take side pressure or torque of cutter; ways run to within 2 inches of center line of arbor—making for very rigid construction.



Front view of Davis & Thompson Multimill — set for milling the fork slot into a rod from solid material.

DAVIS ROTOMATIC

HIGH PRODUCTION MACHINERY

THINS Chip SANS CAN HELP YOU Cut Corners * IN DEFENSE PRODUCTION In this national emergency, Atkins is privileged to offer industry a tried and true method of slashing time on an important phase of production. Wherever operations call for metal cutting, Atkins Curled-Chip System promises new performance, increased efficiency. The special tooth shape which characterizes the saws of this system permit higher saw speeds, longer cutting periods without re-grinding, cleaner more accurate cutting ... Look into these new saws: Clearance Grind Metal Milling Saws (illustrated), Segmental Cold Saw, Powersaw Blades and Metal Cutting Bands. All produce the unique "curled-chips," the modern test for cutting PUTTING efficiency. For complete performance data, send for TEETH the Atkins Curled-Chip Manual. INTO E. C. ATKINS AND COMPANY, 4(6 S. Illinois St., Indianapolis, Ind. DEFENSE **PRODUCTION**

MORE AND MORE Production "ON THE WAY" With Microfinished Precision

Stock removal. up to .060" or .075" at rates as high as 65 cubic inches per hour, to generate correct size, straightness and roundness, is the dominant feature of Micromatic Honing. The Micromatic Honing Process (available with Automatic Microsize for bores up to 2" in diameter and 6" long) will generate uniform size within

.0002" to .0005"—bore accuracy within .0001" to .0002"—removing sufficient stock to get the desired results. Applications to ordnance have included gun tube honing, before and after rifling—gun case honing—internal honing of recoil cylinders—external honing of recoil pistons—reconditioning in placement of worn gun tubes up to 16" caliber.



Typical gun barrels regularly honed in production by Micromatic equipment include 50 caliber machine guns—20 millimeter cannon, 37 millimeter cannon, as well as other and larger calibers up to and including 16" and 18", and from 30" up to 75 feet in length.

External honing of recoil piston rods generates accuracy within .0001" to .0003" and any desirable finish.

Recoil cylinders Micromatic honed. Circular illustration—looking down the bore. The regularity of the eccentric rings (a phenomenon of smooth surface finish) evidences round and straight accuracy generated in typical ordnance applications within .0005" to .0007" as measured with both star and electric gauges.

Typical of tooling used for honing large caliber guns is this hydraulically actuated tool. This tool was designed for bores 18" in diameter, 62 feet long.



Automatic Honing with Automatic MICR.O.SIZE

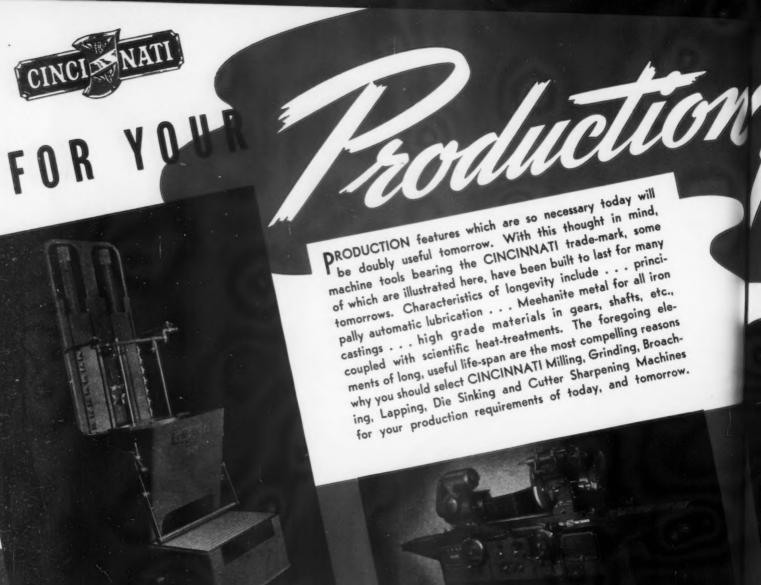
GUNS! GUNS! GUNS!



ings of 3.7" anti-aircraft guns.

MICROMATIC HONE CORPORATION

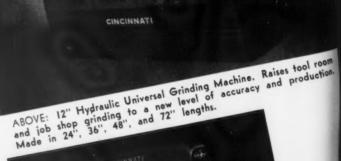
MILWAUKEE DETROIT. MICHIGAN

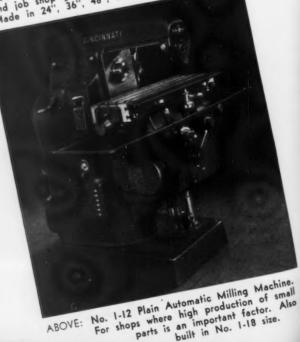


ABOVE: No. 5-54 Duplex Hydro-Broach Machine. A continuous producer: broaches part in one station while other station is producer: Convenient for installation in production line. Hold loaded. Convenient Made in seven sizes, from No. 1-30 to No. 10-66.



ABOVE: No. 0-8 Vertical Mill-ABOVE: No. U-8 Vertical Milling Machine. Important in the production of small parts when vertical milling is desirable.





No. 1-12 Plain Automatic Milling Machine. For shops where high production of small parts is an important factor. Also built in No. 1-18 size.

TOOL ROOM AND MANUFACTURING MILLING MACHINES...SURFACE BROACHING MACHINES...CUTTER SHARPENING MACH

equitements and TOMORROW

PATENT NOTICE
The machines illustrated
The machines illustrated
and described on these
and described factured
pages are manufactured
under and protected
under and pending
by issued and pending
by issued and ForUnited States and Foreign Patents.

ABOVE: Dial Type Milling Machine. Accurate and production and production productive millers for the tool room built in universal productive machine illustrated. Also built in universal shop. Plain machine Nos. 2, 3 and 4 size. and vertical styles.

duction.

ABOVE: No. 2 Centreless Grinding Machine. Slashes plastics, grinding costs on a host of parts; steel, rubber, plastics, grinding costs on a host of rather small lots, too.

Plain Hydromatic Milling Machine. For the heavy jobs quantity production.

Plain Hydromatic Milling Machine quantity production.

Redium or large quantity production.

Made in plain and duplex styles.

Redium or large of each.

No. 2-18 Plain Automatic Milling Machine
No. 4-18 Plain Automatic Fall Mechanism for
with Hydraulic Rise and Fall Mechanism for
with Hydraulic Rise and Fall Mechanism
the Spindle Carrier. Also built in No. 2-24 size.

UNCINNATI GRINDERS INCORPORATED SUNSINNATI

PENING MACHINES ... CENTERTYPE GRINDING MACHINES ... CENTERLESS GRINDING MACHINES ... CENTERLESS LAPPING MACHINES

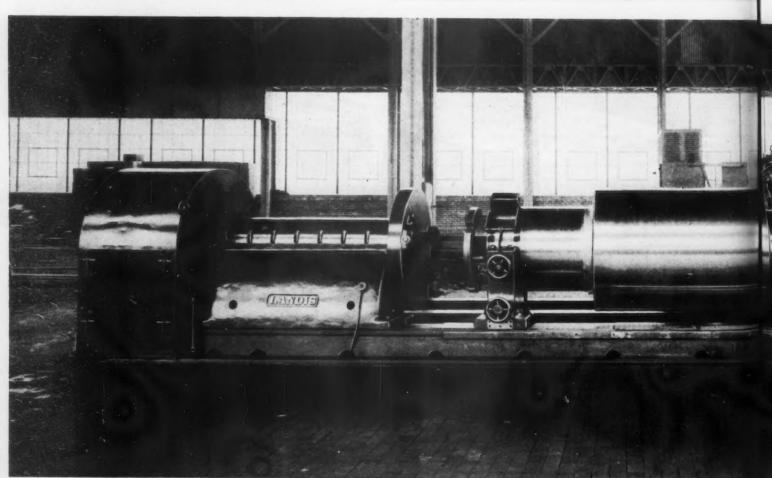


Right:—A Landis 4" Type H Plain Hydraulic Grinder. This modern and compact little machine weighs about 4000 lbs.

Below:—A massive Landis Type 30 Roll Grinder. Many of these Landis built machines weigh as much as 200,000 lbs.







LANDIS TOOL

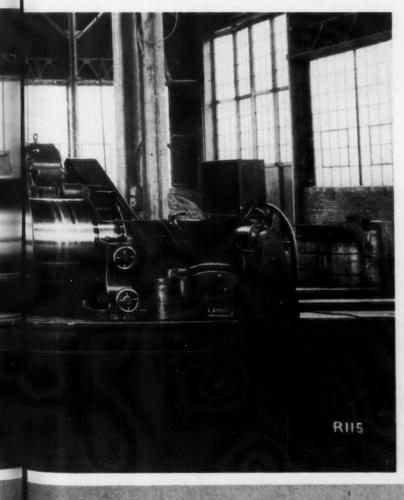
595 MILLION

Even in these days of large figures 595 million is beyond the comprehension of most people. Nevertheless the ratio of 1 to 595 million does accurately represent the mage of work that can be handled on Landis grinders.

The tiny plug gauge illustrated at left is efficiently and precisely ground on a andis 4" Type H Plain Hydraulic Grinder. The plug gauge weighs 2 grains which means that it would take 3500 to equal a pound. On the other hand, the steel mill roll Illustrated at right is accurately ground to a high finish on a Landis Type 30 Roll Grinder. This roll weighs about 170,000 lbs.

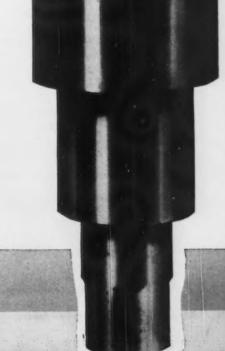
To handle work varying in size from the tiny plug gauge to the massive steel mill roll, the Landis Tool Company manufactures over 150 different standard types and sizes of precision grinding machines. Some, like the Universal grinders, have been developed to grind a large variety of unlike parts on a small lot production basis. Others such as the Plain grinders have been developed for the rapid production grinding of like parts. Still other types of specialized high production machines built by Landis are Cam ginders, Crank grinders, Chucking grinders, IW grinders for multiple diameters, Roll ginders, Valve Face grinders and RACE-A-WAY grinders.

It should not be difficult to choose a grinding machine for any particular part from this list. Why not bring us your work, whether it be large or small, and let us help you ind the most efficient grinder for the job.









WAYNESBORO PENNSYLVANIA

FEATURE (AND MORE) HICH ARE JUCKY FOR YOU!

- 1 Hydraulic clamping.
- 2 Adjustable roller stock lift.
- 3 Gooseneck supporting work firmly on both sides.
- 4 Vickers hydraulic low pressure system for feed and clamping.
- 5 Heat-treated alloy steel gearing and drive shafts.
- 6 Speed obtained through selective sliding gears on splined shafts mounted on anti-friction bearings.
- 7 Saw blade drive has all spur and helical gearing, requiring minimum amount of power.
- 8 Complete saw blade drive contained in saw carriage.
- 9 High speed drive shafts mounted on anti-friction bearings.
- 10 Extra heavy saw carriage with large bearing surface on bed ways to eliminate chatter.
- 11 Large bed ways for saw carriage with long, narrow guide and taper gib adjustment, with automatic oiling for ways. Chip wipers provided.
- 12 Automatic oiling to saw blade drive and carriage ways.
- 13 Hydraulic safety interlock prevents saw carriage from feeding unless work is securely clamped.



An important outcome of these and other proven features is the ability of the Motch & Merryweather Cold Sawing Machine to operate continuously up to its maximum range. You can run it 24 hours a day and maintain that pace week in and week out. You have here a speed that has astonished experts. Moreover, capacity unites with accuracy. Inbuilt stamina and rigidity make for square, clean, burrless cutting all through the run. Scrap is eliminated. In short, you get real, "all-out" production.

THE MOTCH & MERRYWEATHER MACHINERY COMPANY Penton Building · · · Cleveland, Ohio

Built by MOTCH & MERRYWEATHER

MOTCH AND
THE MERRYWEATHER
CLEVELAND
CLEVELAND
PITTSBURGH

IMPORTANT: For best results, use also Motch & Merryweather Segmental Saw Blades and the M. & M. Saw Grinder.



RIGHT: No. 0.8

Plain Automatic
Plain Automatic
Milling Machine,
Milling With rise
equipped with rise
equipped and fall spindle
and fall spindle
carrier. A rapid
carrier for very
producer
small parts.

ABOVE: No. 0-8 Vertical Milling Machine. Important in the ing Machine of small parts when production of small parts when vertical milling is desirable.



HE CINCINNATI WHILING MACHINE CO

FOOL ROOM AND MANUFACTURING MILLING MACHINES... SURFACE BROACHING MACHINES... CUTTER SHARPENING

When High Speed Tools Are Hard to Get You Need These

OLIVER TOOL-SAVERS

Scarcities of high speed tools are making Oliver Tool Conditioners "life savers" of production. In many a plant they are more than paying their way by keeping every drill and cutting tool performing with "new tool" efficiency and accuracy, giving extra hours of tool service that are so valuable today.

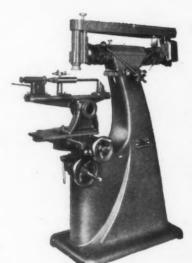
The Oliver Tool Conditioners illustrated are easy to set up, fast and accurate in operation. With them you can reproduce, automatically and with mathematical accuracy, the cutting edges and contours of all types of tools.

And, in addition to longer tool life, Oliver-conditioned tools will give you consistently accurate results, reduced power consumption, fewer rejects and less wasted time—all important factors in speeding up defense production.



OLIVER No. 2 ARC FACE MILL GRINDER

For all face mills from 6 to 26 inches in diameter. Eliminates sharp corners, producing edges perfectly ground to any radius. Oliver-conditioned Face Mills give smoother operation and cut longer between grinds. Used by leading manufacturers in automotive and other high - production indus-



OLIVER UNIVERSAL TOOL AND CUTTER GRINDER

With a few simple fixtures, grinds face mills, slitting saws, end mills, angular cutters, slab mills, spot facers, formed cutters, gear cutters, reamers, etc. Produces accurate clearances by direct reading — uniform teeth, correct angles and accurate cutting edges that give longer tool service. Work is held stationary and grinding wheel traverses tooth, adding to ease and accuracy of operation.

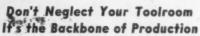
OLIVER INSTRUMENT CO. 1406 E. MAUMEE STREET

ADRIAN, MICHIGAN



OLIVER TEMPLATE TOOL BIT GRINDER

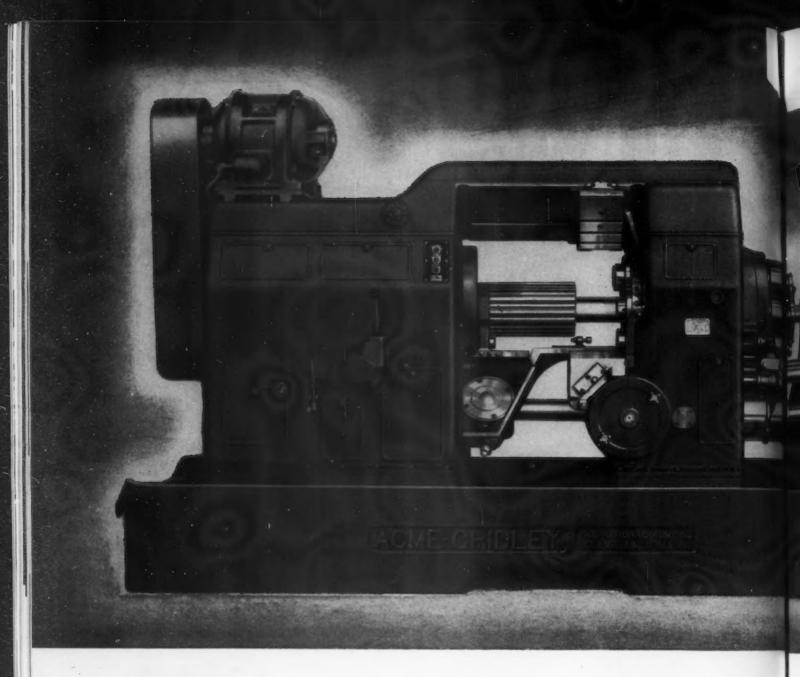
A heavy grinder for reproducing single point lathe, shaper and planer tools from a master template. Simple to set up, easy to operate, assures perfect tools in a fraction of the time required by ordinary methods.



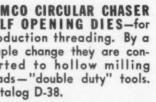


OLIVER No. 510 DRILLPOINTER

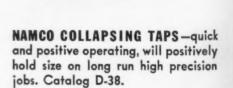
For all drills from 1/4 to 3 inches in diameter—all angles from 82 to 160 degrees. Automatically produces the ideal hollow-ground point with variable clearance that means free cutting in any metal or plastic. Reduces drill cost by getting a greater number of accurate holes from every drill. Reduces production costs by making possible increased feeds and speeds.

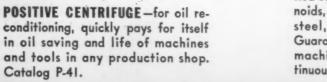
AUTOMATIC DRILL GRINDERS—TOOL AND CUTTER GRINDERS—DRILL POINT THINNERS—TEMPLATE TOOL GRINDERS—FACE MILL GRINDERS, DIEMAKING MACHINES 





Circular chasers minimize scrap loss, save time between grinds —multiply chaser life 10 to 20 times.





SOLENOID COUNTER-with simplified construction, dependable solenoids, working parts of hardened steel, dust proof, legible dial. Guaranteed for life of heavy duty machines at high speed on continuous production.



in Defense

Operate multiple spindle Bar or Chucking Automatics on a 24-hour Defense schedule, push them to the limit of speeds and feeds that tools will safely stand—then you find out how trustworthy they are.

Under just such gruelling conditions, in arsenals and among suppliers of billions of Defense parts, hundreds yes, thousands of Acme-Gridley automatics will continue trustworthy for "the duration" and years after—

Because Acme-Gridley design factors that insure accuracy and stamina were thought out and PROVED out far in advance of today's emergency needs.



THE CHRONOLOG—prints a record showing why, when and how long any production operation is idle. Gives accumulated count of units produced. Production increases average more than 10%. Catalog No. 3707.

ick

ely

ion



STELLITE-WELDED SOLENOIDS—for heavy duty requirements of machine tool manufacturers. Less weight, smaller size and higher pull at less amperage. 4 to 30 pounds at 1" stroke push or pull. Catalog EM-41.



SNAP-LOCK LIMIT SWITCH -"built with machine tool ruggedness" for all normal circuit duty, features 2 double break circuits, separate enclosures for electrical and mechanical sides. Levers to suit. Adopted by over 300 manufacturers as standard built-in switch, used by thousands of others for replacement. Free trial.

HATIONAL ACME

170 EAST 131ST STREET . CLEVELAND, O.

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

HARDENING with

At Low Cost, the New Fellows Flame Hardener produces uniform localized hardening under automatic, precision control.

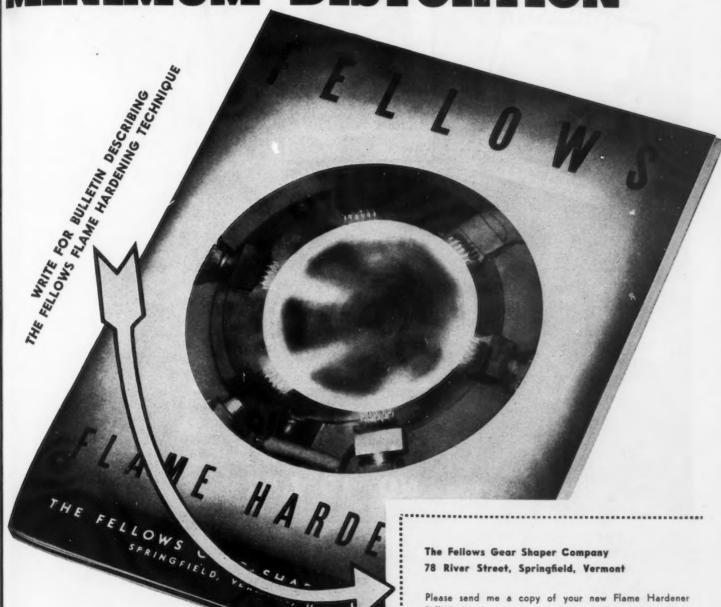
A boon to manufacturers of gears, shafts and other circular parts, because it offers:

- 1. IDEAL FLEXIBILITY . . . since a complete change over for any given part takes less than 30 minutes. Torches and flame-tips are easily adjustable to any position required.
- 2. WIDE-RANGE CAPACITY . . . taking parts up to 101/2 inches in diameter, and shafts up to 36 inches long. Flame area up to 2 inches width on large diameter parts, and 4 inches width where diameter is 4 inches or less.
- 3. UNIFORM HEATING . . . controlled as to distribution and depth. Automatic electric timing makes for identical results throughout a production run.
- 4. EASY OPERATION . . . push button control . . . automatic ejection of gear parts for transfer to cooling tank. . . . Operator protected by water cooled guards.

FELLOWS

MACHINES AND TOOLS FOR GEAR PRODUCTION

MINIMUM DISTORTION





n ly

in es is

n

TION

OM BLANK TO FINISHED GEAR

"LOGAN" EQUIPMENT



LLUSTRATED above are two Model 10 Sundstrand Automatic Lathes equipped with "LOGAN" Hydraulic Cylinders, Chucks, Sure Flow Coolant Pumps and accessories. "LOGAN" Model "HR" double acting, rotating type Hydraulic Cylinders are designed for the efficient operation of chucks and other work holding devices required to be mounted on rotating spindles.

The three-jaw "LOGAN" Chucks provide extra power and exceptional jaw rigidity in heavy duty chucking service. "LOGAN" Sure Flow Pumps assure ample supply of coolant at all times. Let "LOGAN" Sales Representatives and "LOGAN" Engineers make recommendations on your chucking problems.

LOGANSPORT MACHINE, INCORPORATED

914 PAYSON ROAD

Manufacturers of Air and Hydraulic Devices, Chucks, Cylinders, Valves, Presses and Accessories

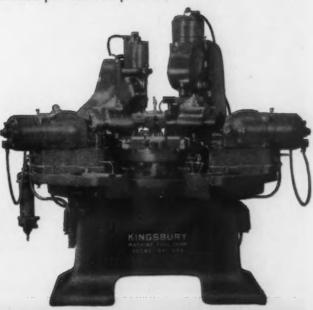
Intricate Fuse Parts Produced with Minimum Number of Chuckings

FLEXIMATIC by KINGSBURY

The blanks for these shell fuse parts are taken from automatics and completed in from one to four handlings. Kingsbury-FLEXIMATICS make it possible to perform in a single chucking a dozen or more highly intricate machining operations on fuse and rifle components and similar parts where speed and accuracy are essential to successful National Defense production.

Munitions production presents a three-fold problem . . . high standards of accuracy, pressing production demands and scarcity of skilled labor. Kingsbury FLEXIMATICS provide—in a single machine—the efficient means to solve all three phases of your defense production problems.

The FLEXIMATIC system of construction consists of Standard Units for drilling, tapping, boring, reaming, spot-facing, etc. Mounted on one of several standard bases. This unique method provides a flexible set-up which can be changed over to meet the machining requirements of many different parts.



KINGSBURY MACHINE TOOL CORPORATION

Reciprocating

s-Draulic

achine Tools

Valuable Aids To Production

Hy-Draulic Machine Tools have exclusive features which make them unusually valuable aids to victory in the battle for maximum production, quality, and economy. The Hy-Draulic drive maintains uniform pressure and speed throughout the cutting stroke. It applies power smoothly, directly, efficiently; works cutting tools to full capacity. Hy-Draulic feeds; like the cutting speeds; are "stepless", can be adjusted quickly to any desired rate whatever in specified ranges. Hy-Draulic Machine Tools use standard constant-speed motors in main drives; are notable for accuracy, operating convenience, power, rigidity, strength and durability. Day and night, we are building Hy-

> Investigate. Write, today, for illustrated bulletins with complete information and specifications. See your local dealer about prices, priorities. and shipments.

Draulic Machine Tools as

fast as it can be done right.

36" Openside Hy-Draulic Shaper

Hy-Draulic

Hy-Draulic

Hy-Draulic

Shapers

16" to 28"

Slotter

36' stroke

Planers Double-Housing and Openside

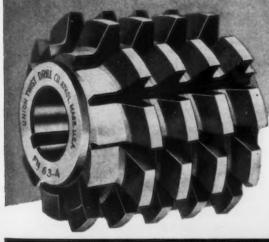
Hy-Draulic Shaper-Planers 66" to 144" stroke



Shapers...Planers...Slotters...Shaper-Planers
Ly-Draulic ROCKFORD MACHINE TOOL CO

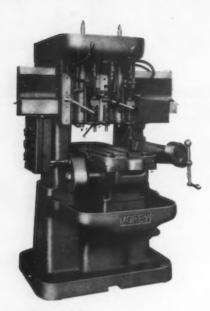
THE TOOLS YOU BUY AGAIN

Twist Drills - Milling Cutters -Reamers — Hobs — Slitting Saws — End Mills - Taps - Dies - Screw Plates - Profile Cutters.



Union Tools have over a period of a great many years been giving such exceptionally fine service that the users have given us repeat orders over and over again. Union Tools really are "the tools you buy again." Use them once and you too will become a satisfied repeat customer.

MOREY MACHINES SPEED PRODUCTION!



PROFILER

No. 12M High Speed Vertical PROFILER and MILLING MACHINE

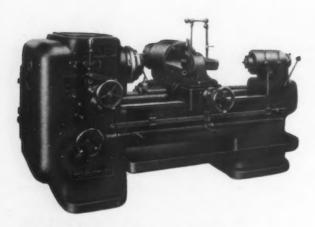
Single and Double Spindle

Unique cross rail design eliminates vibration

Removable spacer permits increased daylight space

Spindle speeds up to 3600 RPM

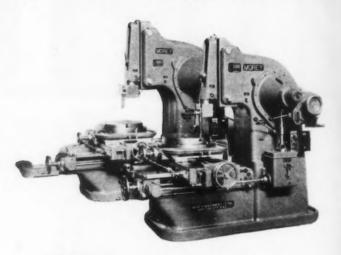
Ask for Circular No. 680



THREAD MILLING MACHINE

For external or internal thread milling Built in one swing, 12", and in any bed length required

Ask for Circular No. 728

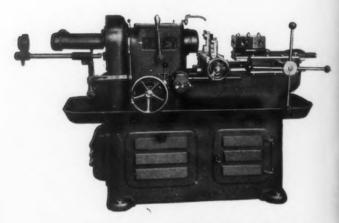


VERTICAL In Two Sizes 8" SHAPER 12"

Directional control Power rapid traverse for all movements Duplex control

Accurate, efficient, easy to operate

Ask for Circular No. 726



No. 2 and No. 3 TURRET LATHES

No. 2 Turret Lathes—geared or plain head Motor drive, 1" wire feed, 61/2" turning length

Ask for Circular No. 629

No. 3 Turret Lathe—plain and Universal type

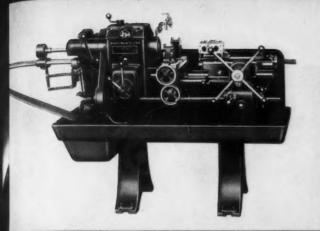
Motor drive, 15%" wire feed, 9" turning length

Ask for Circular No. 727

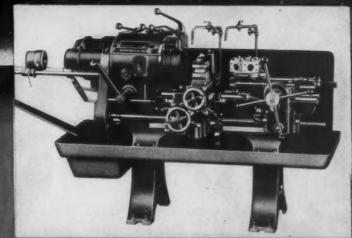
Infinite—spindle speeds*
Hand or screw operated cross slide
Longitudinal feed to the turret
Flexible enough to handle brass or tool steel
Rigid enough to use carboloy tools to their full extent

"SPEED RANGE-#2-from 90 to 1800 or 180 to 3600 RPM #3-from 65 to 1300 or 90 to 1800 RPM

MOREY MACHINERY CO., Inc.
410 BROOME STREET NEW YORK, N. Y.



No. 2 Geared Electric Turret Lathe



No. 3 Universal Turret Lathe

INCREASED PRODUCTIVE CAPACITY AND GREATER PROFIT POTENTIALITIES

are the results of many recent outstanding developments in Bardons & Oliver Turnet Lathes.

Here are a few of the latest cost reducing improvements:

THE SINGLE LEVER SPINDLE SPEED PRESELECTOR on the No. 5 and No. 7 Universal Turret Lathes possesses great possibilities for reducing production costs. Because of the quickness and ease with which the spindle speed changes can be made, the most efficient cutting speed will always be maintained. The extreme simplicity of the hydraulically operated gear shifting mechanism will prove interesting to executives, engineers and production men alike.

THE ABUNDANCE OF SMOOTH FLOWING POWER coupled with versatility and greatest ease of handling makes the No. 3

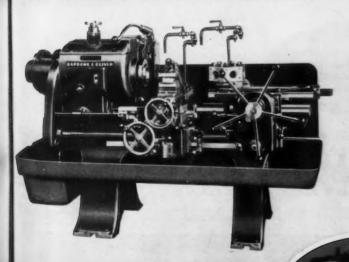
Universal Turret Lathe a highly productive machine on small bar and chucking work.

THE DIRECT READING SINGLE LEVER SPEED AND FEED CONTROLS on the No. 2 Geared Electric Turret Lathe enable the operator to make all changes quickly and accurately, and thus keep the machine running at highest efficiency.

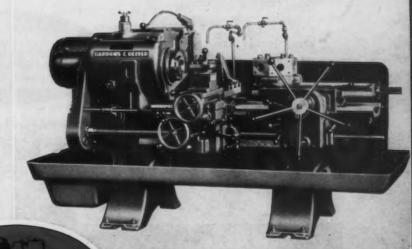
THE FOUR SIZES OF TURRET LATHES cover, by logical steps, but capacities from 1" to 2½" and chucking work of up to 15" diameter. Each size is designed and engineered to handle, with highest efficiency, work coming within its particular range, and is thus outstanding in its own field.

The above features are merely a few of the many recent and interesting developments that will repay further investigation and careful consideration.

BARDONS & OLIVER, INC.

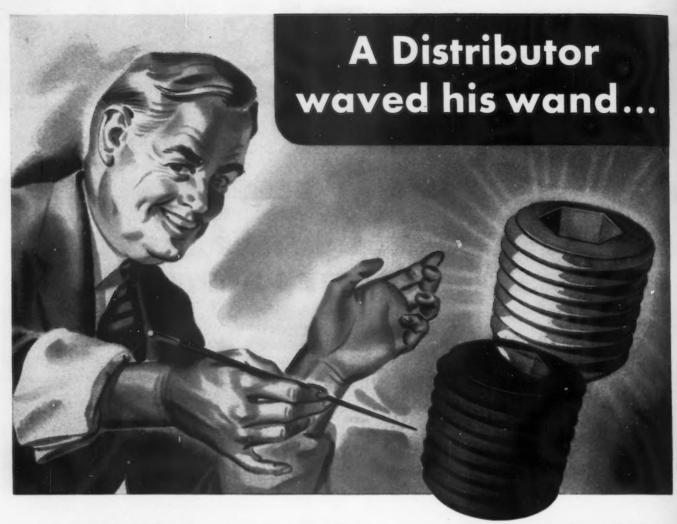


No. 5 Universal Turret Lathe



Dardons

No. 7 Universal Turret Lathe



.. and vital Machine Tools went out on Schedule!

"But I can't use those threaded plugs!" protested the machine tool manufacturer. "They're black—look! I've got to have 'em tinned—here, like this one, see? And we can't ship presses with the oil holes open!"

Well, of course there was a resourceful Distributor on the receiving end of this chat and he had a

friend who knew about plating. And in a jiffy the plugs were completely treated and the presses were shipped on the dot. Sure enough—you may never need plating counsel from your

Distributor. But how fine to remember when you get into any jam, that he is just as near as your telephone and ready to pitch in with whatever the help you need most!

Perhaps the whole story of the Industrial Distributors' contribution to Defense Production will never be told. But you know and we

know they deserve a lot of credit—so we are going right on with our years'-long policy of distributing Drills and Reamers to you through their capable hands.

This incident is typical of the unusual services that many Mill Supply Distributors are rendering their customers, during the Emergency.

We favor adequate Preparedness for National Defense

THE TWIST DRILL COMPANY
1242 EAST 49th STREET
CLEVE LAND

READE ST. NEW YORK 9 NORTH JEFFERSON ST. CHICAGO 650 HOWARD ST. SAN FRANCISCO 5515 SECOND BLVD., DETROIT LONDON - E. P. BARRUS, LTD. - 35-36-37 UPPER THAMES ST., E.C.4

E YOU

"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU



Photo by courtesy United Air Line



The automatic pilot of a modern transport plane is an instrument

of almost uncanny performance. Keeping it in perfect tune calls for precision skill—and precision tools. Here you see an instrument expert using a Nicholson File on a delicate pilot part. It is a precision file. It is made with a keen yet silken-smooth bite that is possible only under exacting manufacturing standards and long experience... Nicholson heritages which enable Nicholson and Black Diamond Files to carry

the extraordinary guarantee of Twelve perfect files in every dozen.

Among the current heavy demands for Nicholson Files, one of the heaviest is for Nicholson X.F. (Extra Fine) Swiss Pattern Files... for the aircraft, automotive, die-making and fine-instrument industries particularly.

The world's largest file manufacturing plant is at peak capacity in turning out these fine files. Consult your mill-supply house.

NICHOLSON FILE CO., Providence, R. I., U. S. A.
(Also Canadian Plant, Port Hope, Ont.)

FREE TECHNICAL BULLETINS and catalog information on X.F. Swiss Pattern, Die-cast, Aluminum, Brass, Stainless Steel, Foundry, Plastics, Shear Tooth and Long Angle Lathe Files. Write us for copies of Bulletins you want.

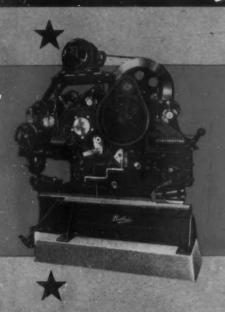
• Five popular shapes (shown about 2/3 actual size) of Nicholson Die-sinker Files in Swiss Pattern. Points are smaller, tapers longer, cuts finer than in the conventional "American Pattern" files for similar purposes. Cleaning out burring, enlarging small holes, shaping and finishing extranarrow grooves, slots, notches and keyways are more readily accomplished.

NICHOLSON FILES

FOR EVERY PURPOSE



HUSKY PARTNERS in Inclustry's Gigantic Task!





This rugged machine accomplishes in seconds what m methods take minutes to do. As versatile as it is easy to co the Buffalo Universal Iron Worker punches . . . shears . . . slits

notches all kinds of stock, such as angles, tees, rounds, squares a flat steel. Solidly built of "Armor Plate" steel, frame electrically welded tool that will serve continuously for years! Details in Bulletin 360.



It's all in the day's work, rapidly and accurately cutting billets to meet the needs of defense production shell stock, crankshaft forging stock, stock for axles and

connecting rods. Frames are rigidly electrically welded, and built of "Armor Plate" steel: Buffalo Billet Shears are readily controlled, economical to operate. Eleven standard sizes for cutting rounds up to 10" and squares up to 9". Details





ENDING R

These speedy, dependable machines enable even unskilled labor to keep up with the production pace - and turn of

simple or difficult arcs, circles, spira and other circular forms with split-se ond efficiency. Adaptable to practically any type of stock. The machines reduce manual operations to a minimum and money on every unit produced. New Bulletin 352-A

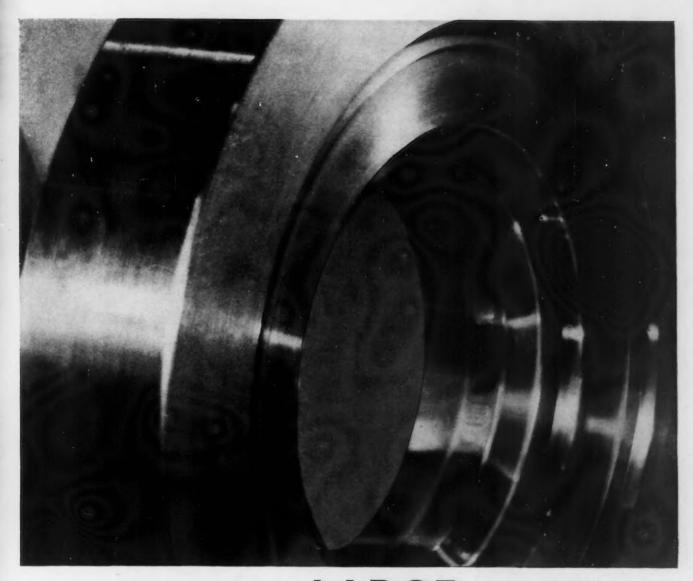


BUFFALO FORGE COMPANY

492 Broadway Buffalo, N. Y. Canadian Blower & Forge Co., Ltd. Kitchener, Ont.



Universal Iron Workers Billet Shears . . Bending Rolls



The Trend Towards LARGE Carboloy Dies For Sheet Metal Forming and Drawing

Particularly noticeable during the past year has been the trend toward use of Carboloy dies in large sizes. During 1941, sheet metal forming dies having Carboloy nibs as large as 9½" hole size by 11¾" outside diameter, as well as large sheet metal drawing dies, were successfully employed. Use of these larger dies has been amply justified by

better finish, closer tolerances and longer die life.

Anticipating a demand for even larger Carboloy Dies to be used in present Defense work as well as for future civilian requirements, we are now installing facilities for producing Carboloy nibs up to 18" hole size and 20" O. D.

CARBOLOY COMPANY, INC., DETROIT, MICH.

CHICAGO • CLEVELAND • NEWARK • LOS ANGELES • PITTSBURGH • PHILADELPHIA • WORCESTER, MASS.

Authorized Distributors: Canadian General Electric Co., Ltd., Toronto, Canada • Hartley Wire Die Company, Thomaston, Conn.







for **PRECISION PRODUCTION ECONOMY**

It takes a lot of cutting off to keep pace with the production requirements of American Industry geared to National Defense, but it's for just such high speed continuous operation that RACINE Hydraulic Saws are built.

The RACINE line offers fully Automatic Hydraulically operated Sawing Machines in five different models ranging in capacity from the RACINE Oil Cut, 6"x6" to RACINE Heavy Duty Hydraulic, $10'' \times 10''$ to $12'' \times 16''$ —These saws will accurately measure and cut off pieces anywhere from 1/64'' to 54'' in length and can be equipped to handle 12, 16, and 20 foot bars or larger.

High speed production without waste of material and with economy of tools is imperative in times of emergency. RACINE Hydraulic Saws do just that by blade saving, oil-cushioned hydraulic power and by accurate fast cutting. Write for information today or have one of our specialized agents located nearest you call and explain.

RACINE TOOL & MACHINE CO., RACINE, WIS.



FIG. 2

FIG. 3



A COMPLETE LINE

Racine offers a full line of standardized and special machines to meet your metal cutting problems. Representative machines are briefly illustrated here . . . complete literature and specifications can be had upon request.

FIG. 1 — Any of RACINE machines can be equipped with portable handling equipment as is the Racine Utility Saw illustrated here. Investigate our special turntable machines, spruce cutters, and other sawing machines.

FIG. 2 — RACINE Shear Cut Production Saws. The exclusive feature of positive, progressive screw feed makes them the outstanding production machines of their size. Each cut is made in exactly the same length of time. No guess work in setting production costs. 6" x 6" and 8" x 9". Write for bulletin 212-8.

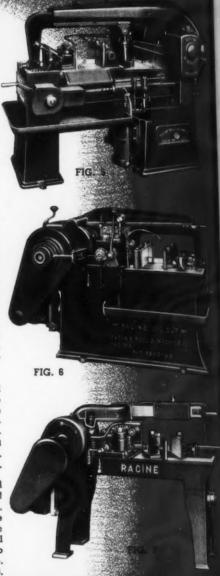
FIG. 3 — RACINE Shear Cut Production Saws. The exclusive feature of positive, progressive screw feed makes them the outstanding production machines of their size. Each cut is made in exactly the same length of time. No guess work in setting production costs. 6" x 6" and 8" x 9". Write for bulletin 212-B.

FIG. 4—The RACINE Utility Saw, Wet Cut Model, 6"x6". The wonder saw at a remarkable low price. Great simplicity. Hydraulic feed and pressure. 2 or 3 speed models available. A general all around shop saw. See Catalog No. 70-B.

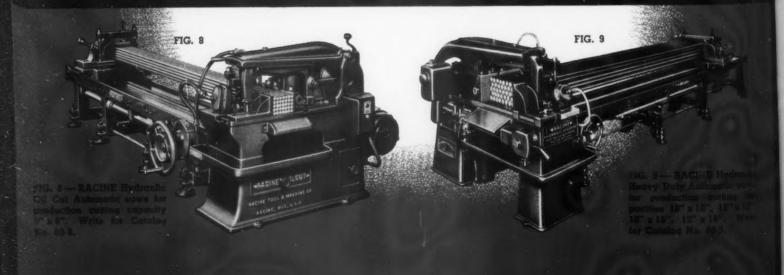
FIG. 5 - RACINE Hydraulic Heavy Duty Model. Capacities 10" x 10" to 14" x 20" with hydraulic feed and control. Guaranteed accuracy and fastest sustained production speeds. The flexible hydraulic control makes these machines the most versatile saws on the market today, cutting the thinnestwalled tubing to tool steels and die-blocks. A real production machine. Write for Catalog No. 80-B.

FIG. 6 — The RACINE Oil Cut, hydraulic feed machine — a general purpose shop saw — fast, accurate, dependable — new in principle, modern in design — 3 speeds — capacity 6" x 6". Write for Catalog No. 60-B.

FIG. 7—The Dry Cut Model of RACINE Utility Saw, still lower in price but accurate, fast and dependable. The auxiliary machine for large shops. A producer for small shops. No machine built to match this at the price. Write for Catalog No. 70-B.



METAL CUTTING MACHINES for EVERY SIZE and PURPOSE



RACINE TOOL & MACHINE CO. . . RACINE

RACINE, WISCONSIN



Cold metal sawing is being put on a true production basis by this new PORTER-McLEOD development. Ability to cut stock from 3 inches up as well as nest bars or shapes for multiple cutting, together with a Standard 3" per minute feed assures time savings in cutting-off operations which take the bottleneck out of cold metal sawing operations. In addition, greater accuracy and lower cutting costs are assured.

SE

With the PORTER-McLEOD, straight cuts in stock at high speed are guaranteed. This advantage is attained by the unique method employed of pulling the blade upward through the stock and at the same time supporting the blade close up to its rim thereby preventing buckling and weaving. Friction disc feed further insures against blade damage particularly when cutting encounters hard spots.

With every tooth of the PORTER-McLEOD saw making cuts, production can be greatly stepped up. If you have a cutting-off problem, now's the time to investigate the assured savings you can make in time, power and maintenance.

Write today for illustrated Bulletin giving full details of this production cutting-off machine.

PORTER-McLEOD MACHINE TOOL CO., INC. HATFIELD, MASS., U.S.A.

for 1942



WE PLEDGE the entire resources, facilities and man power of our organization, twenty-four hours of every day to the production of more grinding wheels of the same high quality, in our endeavor to cooperate to the very fullest with all of America's defense plans. This pledge we make sincerely and most wholeheartedly.

BAY STATE
ABRASIVE PRODUCTS CO.
WESTBORO, MASSACHUSETTS

More KENNAMETAL is Sold To-Day Than Any Other Steel-Cutting Carbide

THE complete acceptance of KENNAMETAL by American Industry offers conclusive proof of the superiority of this steel-cutting carbide tool material. First introduced less than four cutting carbide tool material. First introduced less than four years ago, KENNAMETAL was forced to prove its merit by actual trial in independent machine shops throughout the country. It was found to be so successful in turning, boring, and facing steel parts that sales quickly multiplied . . . and production facilities were rapidly enlarged to take care of the increased demand. As a result, McKenna Metals Company has grown from modest beginnings in 1938 to the largest manufactures of steel entities are hide teach in the country to the coun turer of steel-cutting carbide tools in the country today.

The superior performance of KENNAMETAL tools results from three properties: (1) Greater hardness (the tungsten-titanium carbide in KENNAMETAL is harder than any other tool carbide).
(2) Greater strength, and (3) Superior "crater-resistance." Because of its greater hardness, KENNAMETAL-tipped tools last longer and machine more pieces per tool grind than other carbide tools. Because of its greater strength, KENNAMETAL can take heavy, rough cuts and interrupted or "jump" cuts without breakage. And because of its superior crater resistance, KENNAMETAL

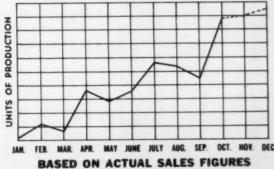
tips are not worn away by the cratering action of steel chips.

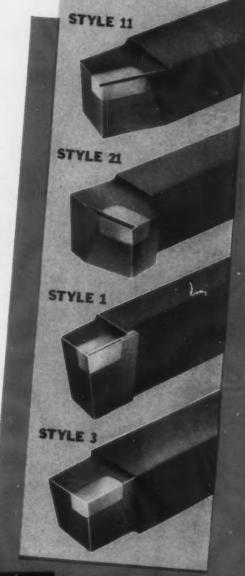
Standard and Modified Standard tools are now shipped within 10 days of receipt of order: Standard tool tips within 3 to 4 days. Write for the new KENNAMETAL Catalog No. 42 giving specifications and prices of standard tools and blanks.













Canadian Representative: KENNAMETAL TOOLS AND MFG. CO., LTD.

THE LARGEST MANUFACTURER OF STEEL - CUTTING CARBIDE TOOLS





ARTER ROTARY SURFACE GRINDERS

are meeting the demands of aircraft and automobile engine manufacturers for precision equipment for grinding the sides of gears.

Smooth surfaces must be produced, accurately flat and parallel, with the grinding lines in a concentric pattern.

Made in capacities up to 40 inches.

ARTER GRINDING MACHINE COMPANY
Worcester
Massachusetts

A NEW 20 INCH DRILL PRESS .. with smooth, positive POWER FEED

This new Drill Press was designed especially to meet today's extraordinary production needs. Its compact, smooth - acting Power Feed operates through a clutch and can be engaged at any point, regardless of spindle position. Unusually well balanced, it operates with equal precision at speeds as low as 260 r. p. m. and as high as 5200 r.p.m., drilling holes from 1/16" to 1". Study the quality features described in the drawing at extreme right and in specifications below - then mail the coupon for further details.

SPECIFICATIONS

CAPACITY-Drills to center of 20" circle. Feed 6". Drills 3/4" hole in steel, 1" in cast iron.

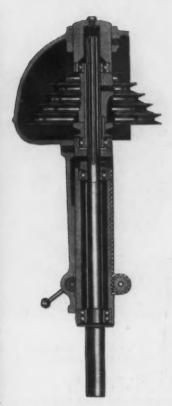
SPINDLE SPEEDS-With 1140 r.p.m. motor: 260, 520, 800, 1200, 1700 r.p.m. With 1740 r.p.m. motor: 400, 800, 1200, 1800, 2600 r.p.m. With 3450 r.p.m. motor: 800, 1600, 2400, 3600, 5200 r.p.m. Special 2-speed motor also available for 3-phase only.

OVERALL DIMENSIONS - Head, front to back, with guard 32". Width 14". Column 334". Height (Floor Model) 74". Table working surface 14" x 18".

POWER FEED-Available with or without power feed. This unit, powered from drill press spindle, has positive clutch and sensitive automatic trip and return. Four feeding speeds: .003", .006", .009", .012" per spindle revolution. Positive depth stop.

MODELS-Single and multiple spindle models available with or without power feed. Single spindle drill presses also available with foot feed.





The solid head casting is precision-bored to fit the machined column and quill. Four precision deep-groove ball bearings assure smooth, frictionless operation of spindle. Bearing above and below the straddle - mounted pulley take the belt strain evenly, preventing whip.

_	WALKER-TURNER COMPANY,						
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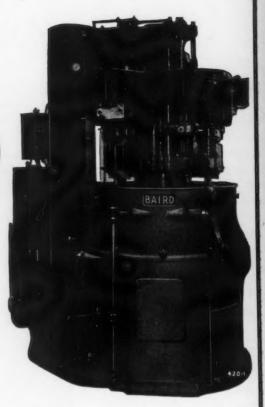
WALKER-TURNER MACHINE TOOLS FOR METAL, WOOD AND PLASTICS

DRILL PRESSES . BAND SAWS . BENCH SAWS . TILTING ARBOR SAWS . LATHES JIG SAWS . RADIAL SAWS . RADIAL DRILLS . BELT AND DISC SURFACERS . JOINTERS SPINDLE SHAPERS . GRINDERS . FLEXIBLE SHAFT MACHINES . CUSTOM BUILT MOTORS

ACCURATE SPEEDY PRODUCTION MACHINES BY







This picture shows a BAIRD 7" SIX SPINDLE HORIZONTAL AUTOMATIC LATHE.

The machine may be arranged for chucked work or for work to be turned on centers and with or without one or more cross slides as well as the five longitudinal tool slides for ordinary turning operations and also arranged to drill one or more holes or to mill or thread or tap and to include a sandpapering or buffing operation and loading and unloading devices. AS THE JOB REQUIRES.

This picture shows a BAIRD II" EIGHT SPINDLE VERTICAL AUTOMATIC INTERNAL GRINDER.

At each station a wheel is provided of the size, grade and speed best for the work to be done at each station.

Each wheel is independently dressed and sized or positioned at each cycle and only according to the need of each, hence least cost for wheels.

As i

Mac beer

make

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Work having two diameters may have wheels arranged for both.

BOTH OF THESE BAIRD MACHINES

Have Automatic Controls.

REQUIRE LEAST WORK BY OPERATOR.

Have Spindle Speeds and Tool Feeds best for each part of each job.

Have Mechanical Chucks requiring neither fluid nor air.

BAIRD Mechanical Chucks have a Maintained, Adjustable Gripping Pressure, a very important point as it practically eliminates the chance of work becoming loose in the chucks.

Have Totally Enclosed Mechanism with Forced Feed Lubrication and High Speed yet Smooth Indexing so that production time is reduced to a minimum.

May be set up DOUBLE-INDEXING which permits of a

piece of work being finished from both ends by being passed through the machine a second time but in continuous operation.

This BAIRD PATENTED TURN-AROUND METHOD can be used on the BAIRD GRINDER to grind from both ends of the work and different diameters if so wanted.

Double Indexing also allows of two pieces of the same work being loaded and unloaded at each cycle, the two pieces being operated on in the same way at the same time.

These methods save handling, floor space, storage, &c., and help in the checking of the work.

Baird Machines thus reduce costs and thereby increase sales and make more work

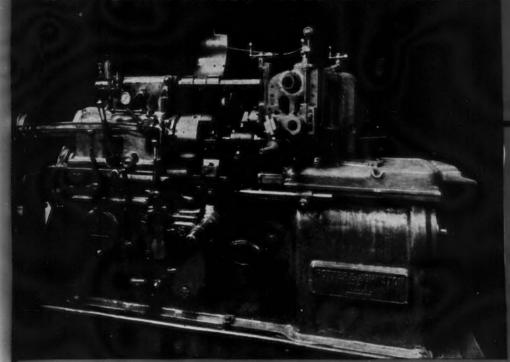
"Ask Baird About It"

THE BAIRD MACHINE COMPANY

BRIDGEPORT, CONN.

Maximum output of BEARING CAGES...

WITH MAINTAINED ACCURACY..ON A



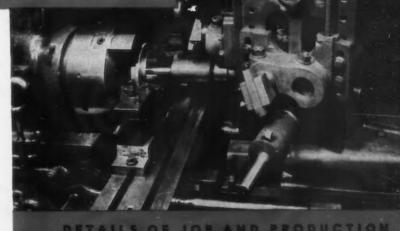
FLOOR TO FLOOR TIME · · 3.27 MINUTES

As in the larger P&J Automatic Chucking and Turning Machines, the design of the smaller 4-D Automatic has been developed to insure the extreme rigidity required to make use of present day cutting materials effectively.

The P&J 4-D Machine shown here has been equipped by P&J Tool Engineers to produce bearing cages to extremely close tolerances. The turning stem tool holders which carry a hardened and ground steel bushing, to receive the overhead pilot bar, in this case have adjustable blocks which cover a wide range of sizes, through the medium of a ball handle screw adjustment.

Of particular interest to production men is the fact that this form of construction can be used as a basis for the design of tools for P&J automatics whenever it is desirable to provide for a quick set-up from one size part to a similar one slightly larger.

features of the P&J 4-D Automatic include: automatic speed and feed changes which assure maximum output; hardened and ground steel ways on machine bed and turret slide; automatic binding of turret after indexing; spindle mounted on Timken tapered roller bearings; an overhead pilot of extreme effectiveness.



AILS OF JOB AND PRODUCTION

POTTER & JOHNSTON MACHINE CO.

Pawtucket, Rhode Island

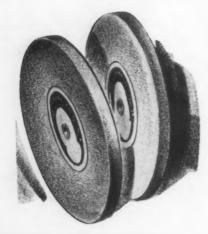
This is one of the most important manufacturing plants in America!



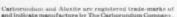
In this backyard shack George Webber of Cleveland is cracking a major defense bottleneck. He has found a way to produce in quantity those vital precision instruments known as block gauges. Few men have ever known how to finish these small blocks of steel to the microscopic accuracy required for modern mass production. Now Webber's secret machine turns out 37 sets, of 81 blocks each. every week with the aid of Aloxite Brand Aluminum Oxide Grinding Wheels.

So perfectly are Webber's block gauges finished with these wheels that they cling with astonishing force when wrung together. Accurate to within four millionths of an inch, they are the standard of measurement for thousands of precision parts essential to America's defense program.





Our ability to furnish the right product for any abrasive need is the result of outstanding research, engineering and manufacturing facilities. Perhaps we can help you speed up production and cut costs. The Carborundum Company, Niagara Falls, New York.





FITCHBURG



On High Speed Work: Bowgage Wheelhead units like this can be mounted on your present machines to increase production and accuracy control by a new application of accepted mechanical principles.



On Mass Production Work: Multiple precision grinding with special machines like these using standard Bowgage Wheelhead units.



On Splines: Greater accuracy at higher speed saves on assembly time, evens torque pressures and produces finishes that wear better on sliding splines, to cut costs and boost profits.



On Plain Cylindrical Work: By cutting out costly frills not needed on normal work and standardizing on low cost, rigidly accurate, long-lived Fitchburg Grinders. They cost less to start with, save money as you use them.



On Gear Grinding: The formed wheel method with an automatic closed cycle produces results in finish and accuracy with speed that will bring out hidden profits.



On Tool Room and Small Lot Work: With Bath full universal grinders, easily and quickly adaptable to external, internal, surface, gear cutter and tool grinding. With this one machine you can do a wide range of precision work.



BURG GRINDING MACHINE CORP.

FITCHBURG, MASSACHUSETTS, U.S.A.

Manufacturers of — Bowgage Wheelhead Units, Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders and Bath Full Universal Grinders.

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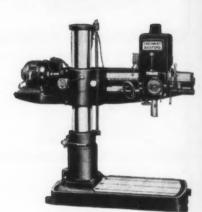
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three how to out grinding coats . . . write to ony or all at them. There is no obtained.

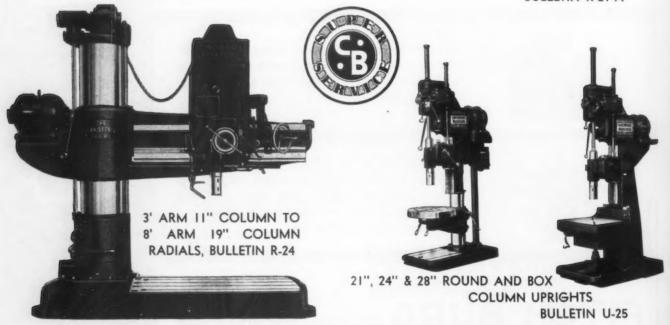
The Cincinnati Bickford SUPER SERVICE Upright and Radial METAL DRILLING MACHINERY

Productivity, Capacity, Adaptability, Reliability, Accuracy, Convenience and Economy are the intangible components that give the Cincinnati Bickford line of drills the appropriate name of SUPER SERVICE.

Examine the possibilities of the machines shown here and for further information send for any or all of the bulletins pertaining to the machines that interest you.



3' OR 4' ARM RADIAL WITH 9" COLUMN BULLETIN R-21-A



THE CINCINNATI BICKFORD TOOL CO.

No. 2 Gun Rifling Machine (below) is built for riffing guns up Can be built either to index the gun or index the bar; and the to 3" bore, 88 feet in length. grooves can be cut or broached. × OHIO Largest Manufacturer of a Complete Line of Lathes CINCINNATI, s stantly for better, faster, and cheaper the page manufacturing machine tools in 1887. Mr. LeBtond has seen his company acquire over 210 patents protecting many exclusive features that now help so materially to speed our national defense program. ... make possible our contribution to defense The nation wide acceptance LeBlond lathes enjoy among arsenals and private plants, comes as a result of continuous, uninter-rupted research and development fostered nized as one of the outstanding leaders of the industry, Mr. LeBlond has sought conby our Founder, Mr. R. K. LeBlond, Recog-COMPANY TOOL MACHIN * with powerful, hydraulic feed and reaming operations on stock any length, and up to 51/4" out-side diameter. * * * * * mechanism, for drilling, boring, 13" Rapid Production Lathe (above) with high-speed anti-friction hasti 13" also available with regular anti-friction, or high-speed mo-ror headshock. 17" and 20" with 6-speed selective geared headshock. No. 2 Deep hole borer (above), THE

A

WICACO MACHINE TOOLS for PRODUCTION with PRECISION

THE WICACO PRECISION INTERNAL GRINDER

Here is the Wicaco Precision Internal Grinder—developed to meet our own exacting requirements, with a continuous record of economical production on work requiring extremely close tolerances.

The accuracy and flexibility of this machine make it a tool room necessity for aircraft, automobile and Diesel engine manufacturers.

Write For Details



THE WICACO PRODUCTION CONTINUOUS OIL GROOVER

If you want high production in oil grooving, this Wicaco machine is unequalled. Up to 500 pieces per hour can be oil-grooved. Setting-up time is negligible and so it is highly profitable to change over to jobs requiring only short runs.

The work is stationary, the tool spindle revolves hence work can be loaded and unloaded without stopping the machine. The tool returns to neutral position automatically.

Widely used for cutting internal and external oil grooves on bushings, bearings, connecting rods, retaining rings, shafts, etc. A real production machine for oil grooving.

Write Today for Complete Details

The

WICACO MACHINE CORP.

Est. 1868 . . . Our 74th Anniversary
Stenton Ave. & Louden St.
Wayne Junction Philadelphia, Pa.

390-THE IRON AGE, January 1, 1942

Sundstrand Engineered Production Multiplies Man-Power



Automatic Stub Lathe Model 8



Automatic Stub Lathe Model 10



Automatic Stub Lathe Model 12

Sundstrand Engineered Production Service places at your disposal years of experience, ability, and data acquired in making the most effective applications of our Automatic Lathes, Rigidmils, and other Sundstrand machine tools. It multiplies your man-power by making best use of machine horsepower and automatic cycles . . . gives you maximum production at minimum cost and operator effort. Fast, accurate, labor saving; Sundstrand machine tools are built in standard semi-standard, and special types and sizes that handle a very large variety of the work-pieces you are being called upon to produce at top speed.

Automatic . . . Sundstrand machine tools are automatic after starting, motor power relieves man-power, operators work more easily, run additional machines without special effort. Rigidmils with hand feed are available when operations warrant their use.

Productive... Sundstrand machine tools work modern cutting materials to full capacity in high-speed cycles having hydraulic, electrical, and mechanical actuation in various combinations. Speed is accompanied by ample power, strength, and rigidity for all work in the capacity of each machine.

Adaptable... Easy set-up, quick change-over, and extremely simple operation are notable Sundstrand qualities. Standard Automatic Stub Lathes and Rigidmils set new high records on mass production, are equally effective on short-run work. Semi-standard and specially equipped Sundstrand machines frequently can be used on different jobs by making simple changes.

At your Service... Our representatives are eager to help you benefit by the enormous productive capacity, flexibility of application, and economy in Sundstrand machine tools... they will get Engineered Production proposals for you promptly... work with you on priorities and earliest available deliveries. Consult them, today.





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P.

Pa.

SUNDSTRAND MACHINE TOOL CO.

2539 ÉLEVENTH STREET, ROCKFORD, ILLINOIS, U.S. A.



WANT DETAILS QUICKLY?

Booklet shown at right contains condensed descriptions of all Sundstrand products and services. Write, today, for your copy. Ask for Bulletin GC-1.

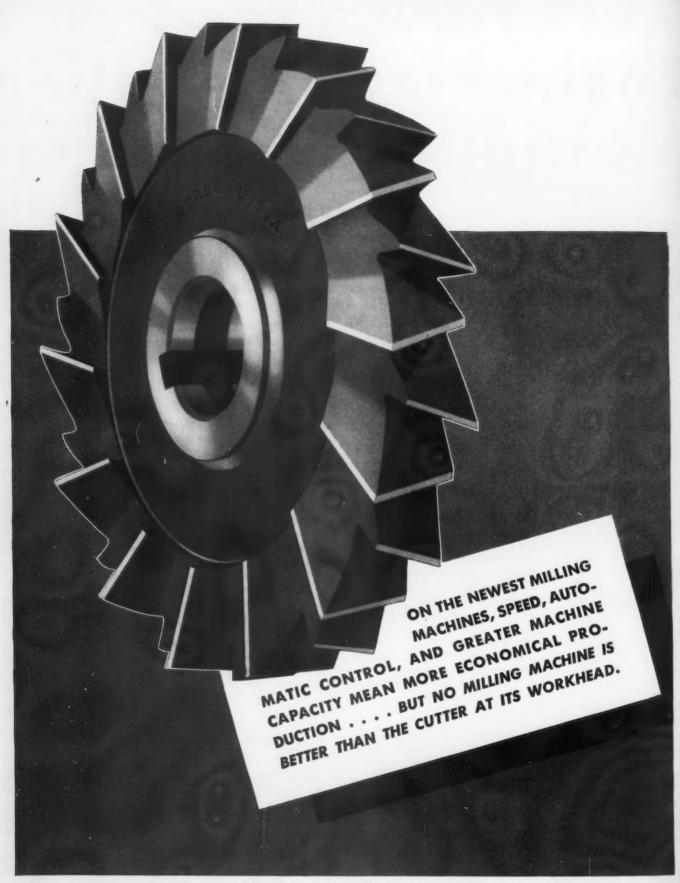


SUNDSTRAND

No. 2 Electromil

No. 33 Duple Fluid-Screw Rigidmil

No. 33 Simples Fluid-Screw Rigidal



MORSETHERE IS A DIFFERENCE

TWIST DRILL AND MACHINE COMPANY

NEW YORK STORE: 130 LAFAYETTE ST. - - - CHICAGO STORE: 570 WEST RANDOLPH ST.



Defense means production so far as industry is concerned, to go all the way on production requires efficient tools for every type of operation.

For screw machine and turret lathe work the efficient tool is the R & L Combination Turning Tool. This one tool does the work of fourteen separate tools. Saves set-up time and cuts production time. Enables you to go "all out" on production.

Repeat orders for R & L Tools constitute 73% of our business, and among these repeating buyers are several builders of automatic screw machines who include R & L Tools as standard equipment.

For faster turning, facing, drilling, boring, etc., on screw machines and turret lathes . . . use R & L Tools!

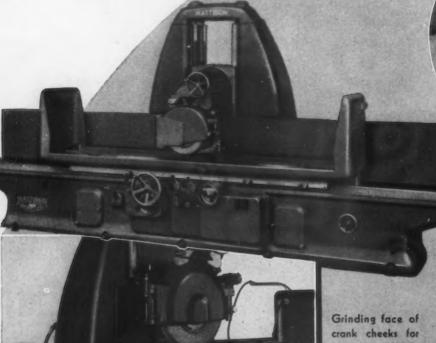
HERE'S YOUR
TICKET FOR
A BULLETIN SHOWING
WHAT THIS
TOOL DOES . .

R & L TOOLS 1825 BRISTOL STREET		PHILADELPHIA, PA
Please send booklet	describing R	& L TOOLS
COMPANY		
INDIVIDUAL NAME		
CITY		

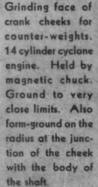
MATTISON SURFACE GRINDERS

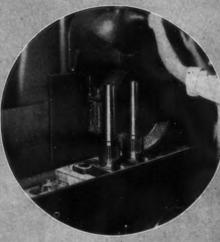
"IN LINE" AT WRIGHT PLANTS

PRECISION WORK on a High Production Basis

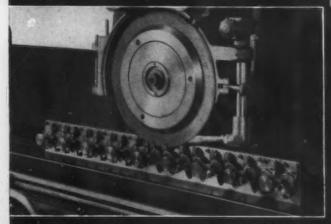


Mattison Surface Grinder with special fixture for grinding the radius at end of articulated rod. A formed wheel is used with the rods indexed for rough grinding; then the fixture is oscillated by power while the table reciprocates to finishgrind the radius, producing a fine finish and accurate radius.





Exhaust manifolds are finish-ground both sides to very close tolerances. Its ability to turn out work to close limits of accuracy at a high production output makes the Mattison Grinder ideal for finishing of aircraft parts.



Narrow slots in end of rocker arm are ground by Grinder. Special fixture allows holding these parts in accurate alignment while slot is ground. With this arrangement several pieces at a time are accurately ground.

Mattison Surface Grinders have proven their value for use in the production of aircraft parts where close precision and high output are required. A few of the factors which account for the success of Mattison Grinders are, the massive double-column support for the wheel-head, high power for rapid stock removal, large table capacity, smooth double-cylinder hydraulic table-drive, simplicity of operation and highly accurate construction. Illustrated are a few typical aircraft applications of the Mattison Grinders at the Wright Aeronautical and Curtiss-Wright Plants.

MATTISON MACHINE WORKS ROCKFORD, ILLINOIS, U.S.A.



Baush Speeds Production of Packard Rolls Royce Aircraft Engines

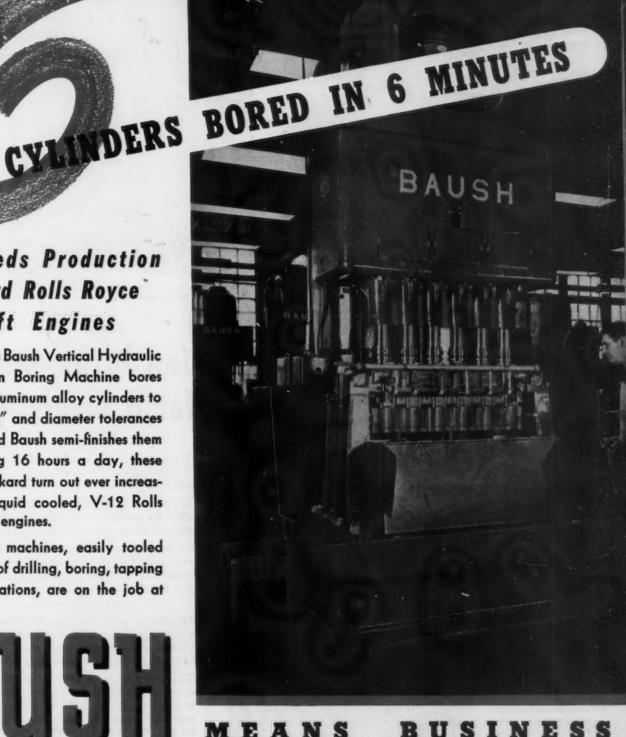
Every 6 minutes this Baush Vertical Hydraulic 6-Spindle Precision Boring Machine bores a bank of tough aluminum alloy cylinders to a depth of about 8" and diameter tolerances of .003". A second Baush semi-finishes them to .001". Working 16 hours a day, these machines help Packard turn out ever increasing numbers of liquid cooled, V-12 Rolls Royce Merlin XX engines.

And other Baush machines, easily tooled for a wide variety of drilling, boring, tapping and reaming operations, are on the job at Packard.

MACHINE Springfield, Mass.

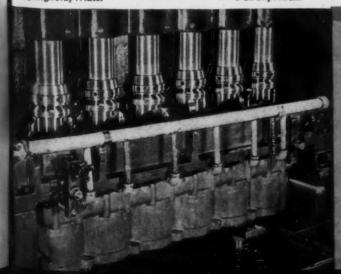
TOOL

COMPANY Detroit, Mich.



BUSINESS

For over 45 years Baush has pioneered in multiple spindle drilling. Expert engineering service is available. Write, wire or phone today.



FEATURES OF BAUSH W-8 PRECISION BORING MACHINE

- Hydraulic feed, electrically cor rolled by solenoids. 18" forward piston stroke in hydraulic cylinder.
- Two spindle speeds: 45 R.P.M. and 90 R.P.M., by means of two speed motor.
- · Semi-automatic operation with push button starting. Automatically operated feed selector; automatic stop at end of machining
- Ways compensated for wear by bronze taper wear strip.

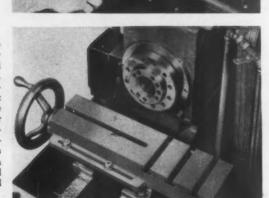




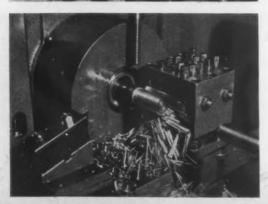
Note the extreme simplicity of this machine with its manually operated, 6-position turns. Makes possible rapid training of new men. Highly skilled operators not required.

A first and second operation lathe, engineered for a diversity of uses

Manually operated and hand indexed six-position turret. Each face of turret tapped with six 1-1/2" diameter holes for mounting various sizes of tool holders. Lever below turret serves to lock turret rigidly in desired position and also serves to release lock stud when hand indexing.



Screw Feed Cross Slide is mounted on unusually ample dovetail ways and provided with taper gib. Equipped with longitudinal "T" slot on front side and three transverse "T" slots on rear side for rigidly mounting a variety of tool posts and fixtures. (No. 601 machines can be supplied with either the screw feed cross slide, or lever feed cross slide, as desired.)



Equipped with WORM DRIVE, the No. 601 machine is capable of making unusually heavy forming cuts without chatter. The hardened and ground steel worm, like the spindle, is mounted in ball bearings and transmits a smooth flow of power through a bronze worm gear to the spindle.

Form, tap, ream, chamfer, knurl, bore, thread, face, cut off. Those and more jobs are performed with speed and precision on the Oster No. 601 bar and chucking machine.

It's a strictly modern machine, easy to operate, adaptable to meet YOUR specific needs, and moderately priced. (Less than \$2000.00, without tools).

Oster's 48 years of experience in meeting precision demands for power pipe threading equipment give assurance that the same high standards are built into the No. 601 machine.

Brief Outline of Details

No. 601 is motor driven. Designed with hand feed to cross slide. Equipped with manually operated, six-position turret; or with plain saddle (where the machine is required for three or fewer operations in sequence.)

Two types of drive are optional: WORM DRIVE which transmits a smooth, even flow of power through a bronze worm wheel to spindle, enabling the machine to make unusually heavy forming cuts with absence of chatter, or with DIRECT DRIVE for high speeds over a wide range up to 3000 R. P. M. on small diameter work or on non-ferrous metals. Quick change sheaves and the two-speed, 2-H.P. motor, manually controlled, drive the spindle through triple V-belts. Anti-friction bearing mounting of the spindle makes high speeds practical.

Automatic chuck capacity: 1-1/2" round bar; 1-1/16" square bar; 1-5/16" hex bar. Swing over bed: 14". Swing over cross slide: 6-1/2". Carriage travel: 11" when there is a cross slide on the 33" main ways. Maximum movement of screw feed cross slide is 6-1/2" and of lever feed cross slide, 4-1/2".

For complete details, send for Catalog No. 27-A.

THE OSTER MANUFACTURING COMPANY 2038 East 61st Street • Cleveland, Ohio • U. S. A.

GET GOING AND KEEP GOING FASTER WITH AN



WHERE YOU CAN'T USE CEMENTED CARBIDES GET A

• Where you can't use cemented carbides, this is the easiest way to get a big plus in production. Figure out for yourself what it would mean if you could increase your cutting speeds 50% —And some have doubled their speeds just by substituting Tantung "G" tools. The same tools work equally well on steel, cast iron and non-ferrous metals.

It's so easy too, to make the switch to Tantung "G". Tools are available as standard in a wide variety of sizes in solid tool bits, all purpose tools, cutting off tools, and as blades for inserted tooth milling cutters. Special tools can be made for the unusual setup.

You owe it to yourself to get full particulars at once.

VASCOLOY-RAMET CORPORATION

NORTH CHICAGO, ILLINOIS

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IN CANADA: Carbide Tool & Die Company, Ltd., Hamilton, Ont.

421

ECONOMY TOOLS ALL PURPOSE TOOLS CUTTING-OFF TOOLS SPECIAL TOOLS MILLING CUTTER BLADES SOLID TOOL BITS

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7-A.

PANY

U. S. A.

THE IRON AGE, January 1, 1942-397

★ The M-3 has terrific fire-power. It is equipped with a semi-automatic cannon, one anti-aircraft gun and four machine guns; manned by a crew of seven. . . .

SUPER CTION PROTECTION

Rolling fortress shown above is a U. S. Army M-3, most powerful tank of its type in the world*—SUPER PROTECTION against foreign encroachment upon the American Way of Life...

Just as outstanding in their own field are HOWELL Motors, now helping to win the battle of production in defense plants from coast to coast . . .

The new HOWELL Motors give SUPER PROTECTION against dripping liquids and falling particles, against winding failures and destructive vibration . . .

Improved motor performance?—yes, immeasurably! It will pay you to find out!

NEW SUPER PROTECTED MOTOR—frame and base non-breakable; no working part exposed; windings heavily insulated, using covered enamel wire triple-freated with moisture-proof insulating varnish; rotors dynamically balanced to close limits; completed motors precision tested.

HOWELL ELECTRIC MOTORS COMPANY HOWELL, MICHIGAN · · · Representatives in All Principal Cities





THE JOB: To put machining of pump rotor slots on production basis.

THE METHOD: Broaching two slots at a time in two passes.

THE RESULT: Lower cost per piece, fewer machines, tool room precision in production.

FACED with the problem of stepping up rotor production for precision hydraulic pumps from a-few-at-a-time to a capacity of several thousand per month, broaching was found to provide the answer to low-cost production accuracy.

On a job-lot basis, these slots -only about 5/64 inch across -are held to plus or minus two and one half ten thousandths with greater ease and uniformity by broaching than it was possible to hold the same parts, a few pieces at a time, by milling.

Even if the job could be done as well, it would have taken quite a few mill- More details on this operation are to be found ing and drilling machines to do the same job in the current issue of "Broaching News". We'll

as the single two-broach equipped Colonial. be glad to send you a copy. Ask for issue No. 10.

OLONIAL BROACH COMPANY

147 JOS. CAMPAU ST. DETROIT, U. S. A.

400-THE IRON AGE, January 1, 1942

GRAND RAPIDS

for EVERY GRINDING NEED

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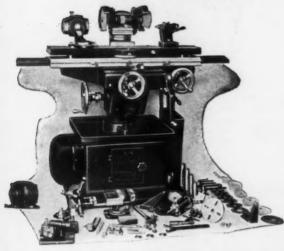
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GRINDING Longer life for your drills and taps! More accurate holes with less fre-

TOOL and CUTTER GRINDING



One machine for grinding gear cutters, formed cutters, angle cutters, face mills, end mills, side mills, spiral and plain milling cutters, thread chasing tools, reamers, hobs, etc. . . . for performing internal and surface grinding on precision toolroom jobs. Grand Rapids Universal Tool and Cutter Grinders enable you to keep all your tools perfectly sharpened and thereby get longer service, more accurate results and higher production. Let us send you full details of this versatile machine—virtually a complete tool sharpening department in itself!

GALLMEYER & LIVINGSTON CO.

336 STRAIGHT AVE., S.W. GRAND RAPIDS, MICH.

HYDRAULIC FEED SURFACE GRINDER for

tinued accuracy. Write for descriptive bulletin.

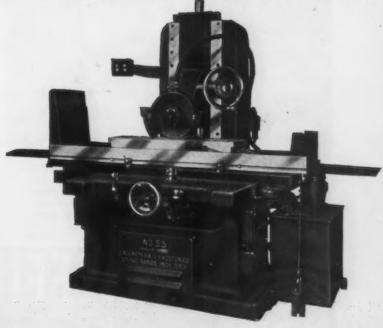
quent regrinding! These are the

means to increased production and important tool economies. Grand

Rapids Drill and Tap Grinders automatically grind correct angles on

drills of all sizes, producing a drill point correctly centered, with gradually increasing clearance that cuts faster and more easily. Heavy column and stand construction, oversize wheel flanges, precision ground spindle with dust-proof bearing mount—all contribute to con-

TOOLROOM and PRODUCTION GRINDING

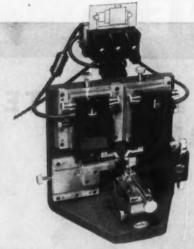


Massive, one piece column and base insure maximum rigidity and permanent alignment . . . Patented vernier control of elevating mechanism, graduated in .0001", splits tenths easily, even on production jobs. Hydraulic feed eliminates all gears in longitudinal and cross feed—produces smoother work, free from gear marks. Two spindle speeds make it possible to save and use worn wheels. Write for Catalog G-L-100, describing this No. 55 Grinder, as well as larger and smaller models from the complete Grand Rapids Line.

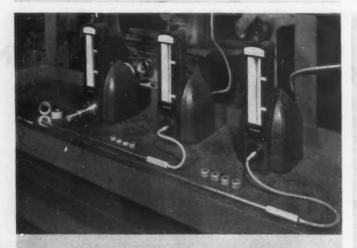
SHEFFIELD PRECISION INSTRUMENTS



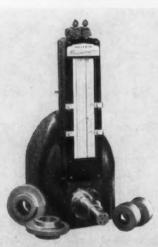
The Visual Gage in magnifications of 10.000, 5000, 2000, 1000 and 500 to one is used for the checking of master and production gages, purchased parts on arrival—also for process and production inspection, laboratory and research work. The Visual Gage checks external and internal dimensions and screw threads.



The Multichek is a combination gage to check simultaneously a number of critical dimensions. It indicates by light signals whether each dimension is within, above or below tolerance limits. A master signal light may be used to integrate all signals for maximum checking speed.



The Precisionaire Model A is a flow type air gage for checking diameter, taper and out-of-round conditions in long and/or small bores such as rifle barrels—also in relatively inaccessible holes which cannot be brought to the gage.



The Precisionaire Model B is similar in construction to Model A except that the work is presented to the gage. Either model may be used to check highly finished work without danger of scratching the finish.







BAKERIRILLS

EXTRA-HEAVY DUTY
HORIZONTAL ONE WAYMACHINES FOR
OPERATIONS ON BOMBS

Handling Multi-operations in Nose and Base ends of 100 lb.-300 lb. and 500 lb. Bomb



Two Machines recommended, one for base and one for nose end.

OPERATION: First cutting station, drill 1½" diameter; second cutting station, rough bore nose and chamfer. Third cutting station, finish bore nose and face. Fourth cutting station, tap 2¾" diameter, 12 threads per inch using collapsible type tap. These operations performed in nose end of bomb on first machine.

OPERATIONS HANDLED ON SECOND MA-CHINE: In base end as follows: First cutting station, face and bore; second cutting station, hollow mill; third station, machine groove. Fourth cutting station, thread outside diameter with die head. No. 3½x16 — one way — horizontal Hydraulic Feed.

Part handled:—100 and 300 lb. Bombs.

FEATURES: Heavy duty 3 spindle fixed center head on main hydraulic unit for operations at first three cutting stations. Auxiliary individual single spindle tapping unit mounted at fourth station for threading operations.

Saddles of hydraulic unit mounted on nitralloy bars.

Five-station trunnion fixture furnished on both machines allowing for loading station while machine is cutting, meaning higher production.

OUR MOTTO SINCE 1867

"MACHINES: STURDY and EFFICIENT, AS FINE AS CAN BE BUILT"

BAKER BROTHERS INC. Toledo, Ohio, U.S.A.

DRILLING . BORING . TAPPING . AND . KEYSEATING MACHINES



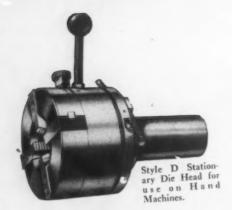
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THAN HARD STEEL GAGE BLOCKS

DEARBORN GAGE COMPANY

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Precision Threading Machines. Built in 3 sizes.

From
TINY FUSE PARTS TO
HUGE TANK CASTINGS

From
SHELLS TO RANGE FINDERS

If it's Threaded

GEOMETRIC

Geometric Die Heads are serving Defense Industries in cutting threads as small as .050" in diameter, 100 threads per inch. They are also used on armor bolts 4 inches in diameter, four threads per inch. Thus if it's an external threading job from .050" to 10", you probably will find Geometric has a tool for the job—and one backed by years of experience on jobs just like yours.

Geometric Collapsing Taps are used on a wide range of internal work from shell noses in steel forgings to fine pitch threads in brass, or aluminum. From one inch to ten inch is the diameter range for Geometric Collapsing Taps.

Long accustomed to working to tenths of a thousandth tolerances, you'll find Geometric builds Threading Tools made with fine accuracy for your precision threading needs.

Self Opening Die Heads Solid Adjustable Die Heads Collapsing Taps Solid Adjustable Taps Threading Machines Chaser Grinders

GEOMETRIC

TOOL CO.,

New Haven, Conn.

Specialists in PRODUCTION THREADING TOOLS

Since 1895



TOOTH FORM

AN IMPORTANT

ADVANCE
IN GEAR PRACTICE

Gear tooth contact is one of the most important factors in gear operation, efficiency and service. In a large percentage of cases both gear failure and gear noise are the result of deflections or of slight misalignments of gear axes in either the horizontal or the vertical planes.

This trouble is completely eliminated by the use of the ELLIPTOID tooth form which has been developed by Red Ring engineers for both spur and helical gears.

A horizontal section through an accurately formed conventional tooth has sides that are straight. But with the ELLIPTOID tooth the sides are elliptical, thus making the tooth thicker at the center by .0002" than at the edges or wherever it is desired to locate the contact.

This .0002" is well within customary allowable limits for good gear practice, but by the Red Ring method this can be varied to meet various conditions.

It has been discovered that on the basis of the tooth form design in the transmission gearing of five years ago, it is now possible to reduce gear size, weight and cost for any specified loading by reducing the pitch and making the teeth in the ELLIPTOID form.

The ELLIPTOID form is produced on the Red Ring Gear Finishing Machine as part of the regular gear shaving operation. It requires no extra machine time, no special skill on the part of the operator. Write for descriptive bulletin.



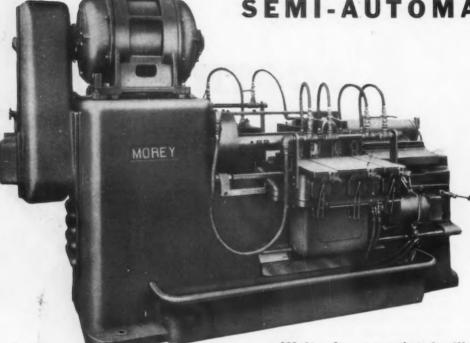
NATIONAL BROACH AND MACHINE CO.

5600 ST. JEAN . DETROIT, MICHIGAN

TO SPEED SHELL PRODUCTION!

Investigate MOREY "27"

SEMI-AUTOMATIC LATHE



A complete feeding and return cycle.

A single movement of the starting lever starts the spindle revolving and the tools feeding. When the work is completed, the tool is returned to the loading position, the spindle stops and the work unclamps—ready for removal.

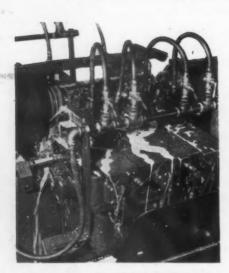
The operator is an attendant unskilled labor may be employed.

Built for rough and finish turning Shells from 105mm. to 7" in diameter.

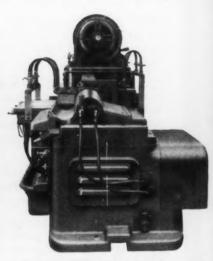
Write for completely illustrated Bulletin No. 715



End view—MOREY "27" Automatic Lathe Tooled for rough turning 155 mm, Shell showing tailstock in the loading and unloading position.



Close-up of MOREY "27" Automatic Lathe Tooled for turning the boattail O.D. cutting off to length and facing towards center 155 mm. shell. Turning time—1 minute, 40 seconds.



End view—MOREY "27" Automatic Lathe Tooled for rough turning 155 mm. shell showing tailstock in the loaded position.

While this lathe was developed primarily for the manufacture of Shells, it can be used to advantage for many other types of turnings which can be held in an arbor and chuck.

MOREY MACHINERY CO., Inc.
ALD BROOME STREET NEW YORK, N. Y.





HONERS . . . Above, left, No. 249's hone airplane motor cylinders; right, No. 306 finishes landing gear bores, wide variety of other work. Below, left, Horizontal Honers in many sizes for work to 75 feet or longer; right, No. 224 for small work.

BARNESDRIL

Honing Machines
Drilling Machines

BARNESDRIL Honers lead the world for accuracy, speed, and fine finish on internal cylindrical surfaces of any diameter and length, also certain external honing. Extensive line includes Vertical and Horizontal, also Combination Boring and Honing.

BARNESDRIL Drilling Machines are made in Single-Spindle, Multi-Spindle, Gangs, and High Production Units. Many sizes and types. Capacities to 4" diameter drill or equal.

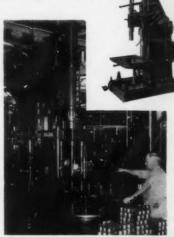
At right . . . No. 2011/4 High Production Unit with Hydraulic indexing Table. Threespindle head and 4-station fixture gives work-handling free. Many others available for a multitude of operations in various

combinations.

WRITE FOR
CATALOGI







DRILLERS . . . Above, Hydram high-production on airplane engine connecting rods. Above at right, No. 262 has adjustable head; is extremely versatile, popular in tool rooms, airplane shops. See Catalog for many other types and sizes.

TH

Barnes Drill Co. ROCKFORD

For rough turning and finishing of heavy forgings...

60" Heavy Duty
FORGE TURNING LATHE



THE ENTERPRISE COMPANY. COLUMBIANA, OHIO
Builders of Machinery

MAKE SAVINGS in 1942 with HOSDICK

THE RIGHT DRILL FOR EVERY PRODUCTION NEED

For Small Drilling up to 11/4"

THE FOSDICK HIGH SPEED BALL BEARING SENSITIVE

Available with 6, 9, 12, or 18 speeds, from very low to extremely high spindle speeds. Any number of spindles up to six can be supplied, and each spindle can be provided with power feed, hand feed, or tapping attachment.

An unusual machine of unusual dimensions for universal work

No. 2-13" SUPERSPEED BALL BEARING .. SENSITIVE DRILL

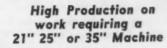
Built for superspeed production in accordance with the latest drilling practice. Spindle speeds up to 12,000 r.p.m. Spindle is multisplined, made of best high carbon steel, accurately ground, tested to perfect alignment and running balance and has adjustment to take up ment to take up wear. Fully guaran-teed in every re

Economical operation on large and small jobs

THE FOSDICK JIG BORER

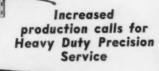
Enables an average drill press operator to perform accurate work on
iigs, fixtures and miscellaneous production parts and, at the same time,
will make small quantities economically possible . . Fosdick offers
you this dual advantage, at a small
investment, in this
precision machine.





THE ECONOMAX UPRIGHT SUPREME

A machine which offers in every one of its many outstanding features a greater inherent ability to improve production through increased capacity, ease of operation, greater accuracy, and economy.



THE ECONOMAX HYDRAULIC RADIAL

Rugged construction throughout; 36 spindle speeds; 18 feeds; centralized hydraulic con-trol, with variable hydraulic traverse to the head, hydraulic column clamp and hydrau-lic arm clamp. Many additional features.



-OSDICK MACHINE TOOL COMPANY

CINCINNATI, OHIO

undardized Set-up Appliances



Speed up defense work in machine shops by using CAD Equipment. CAD Standardized appliances expedite machine tool set-ups-cut non-productive time to the bone. CAD Bolts fit T-slots when ordinary bolts are ruinous. CAD Bolts, clamps, jacks, step-up blocks, wedges, spacers make the set-up job a snap-they save time and money every day.

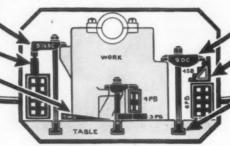
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WRITE TODAY FOR BULLETIN A-70





STANDARD SHOP EQUIPMENT CO.

Minnimin III

Set-up appliances for machine tools 8172 TINICUM AVE., PHILADELPHIA, PA.

SAFETY MARKING TOOLS FOR METAL-WORKING PLANTS

Manufactured and Sold by

M. E. Cunningham Co.

101 E. Carson St., Pgh., Pa.

SAFETY LETTERS AND FIGURES HEAVY BEVEL WEDGE GRIP STYLE



For all kinds of single character marking sizes 1/6" to 1/2" carried in stock.

BOX TYPE HOLDER



For marking castings, tubes, etc. Knurled, Wedge Shapes Sides assures more safety.

WEDGE GRIP HOLDER



For marking slabs, billets, and many other flat, squares, or angular products. Box levels Holder and assures even impression. Made for any size or number of characters.



For marking gears, airplane and other machine parts. Patented Safety Snap provides quick change of type inserts.

AMMCO 7" SHAPER

"A precision machine of a thousand uses"



--IT'S PORTABLE--

Saves Steps and Time

Don't tie up a big shaper when so many jobs can be done just as accurately and much quicker on AMMCO 7" PRECISION SHAPER.

. . . Available for stationary installation or mounted on portable cabinet easily rolled to the mechanic's work bench.

Features of this Shaper include quick adjustment of stroke, ram position, tool head, table height, table support, feed and speed . . .

The maximum length of stroke is 7½"... Table has five cross feeds (reversible)... Countershaft has three-step cone pulley... ½ or 1/3 H.P. motor.
Manufactured by an organization having years of experience in producing precision machinery... Recommended by leading machine tool dealers and machine tool manufacturers. Write for Specifications and Prices.

AUTOMOTIVE MAINTENANCE MACHINERY CO.

2118 Commonwealth Avenue

North Chicago, III.



HYPRO PLANERS

NEW AND MODERN CINCINNATI HYPRO MACHINE TOOLS

DESIGNED for the most exacting service and built to "take it" under high production, continuous operation—Cincinnati Hypro Planers, Millers and Vertical Boring Mills can be depended on to deliver the goods—and cut both time and costs.

Sturdiness, adaptability and operating flexibility are combined in these machines to produce fast, accurate work. "Profits in the making" are assured in every shop that puts these modern machines to work.

HYPRO PLANERS

These machine tools are outstanding in their high productive capacity and are designed for the utmost rigidity in supporting both tool and work. With a range of table speeds from 8' to 240' per minute on cut and return strokes they are adapted to a wide range of work and assure maximum speed on any specific job. Smooth flowing power is assured by herring-bone table drive. Side thrust pressures are eliminated.

HYPRO MILLERS

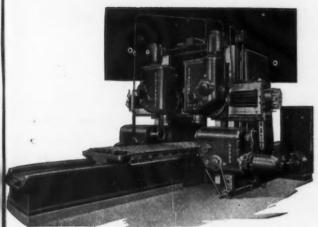
The new Cincinnati Hypro Planer Type Millers are designed with massive pyramid shape housings and with a table drive that delivers smooth flowing, efficiently transmitted power which is free from side thrust pressures. Milling heads are completely self-contained and Timkenized. Many other outstanding features are offered which command attention. Investigate NOWI

BORING MILLS

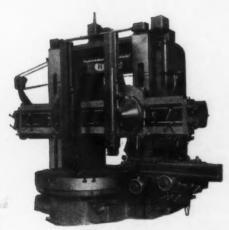
These modern units provide spiral bevel gear table, a completely Timkenized speed box as well as rail head saddles that are mounted in antifriction roller bearings. Many other details of design and construction have been developed in these machines to assure high production, low operating cost. convenience and fast economical work. Explore their possibilities on your difficult jobs.

OPENSIDE PLANERS

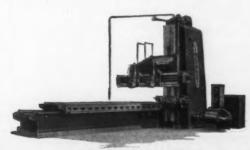
These Cincinnati units are built in both openside and double housing types. Simple, convenient and trouble-free magnetic feeds are provided for all heads. Feeds are available in increments of 64ths from 1/64" to 1". Ask our engineers how you can eliminate bottle necks in your production and save money with these modern machines.



HYPRO MILLERS



BORING MILLS



OPENSIDE PLANERS

A Complete Line

CINCINNATI HYPRO MILLERS—Sizes up to 120".

CINCINNATI VERTICAL BORING MILLS—4', 5', 6', 7', 8', 10' and 12', also 10-16' Extension Mill.

CINCINNATI OPENSIDE PLANERS—30" to 120".

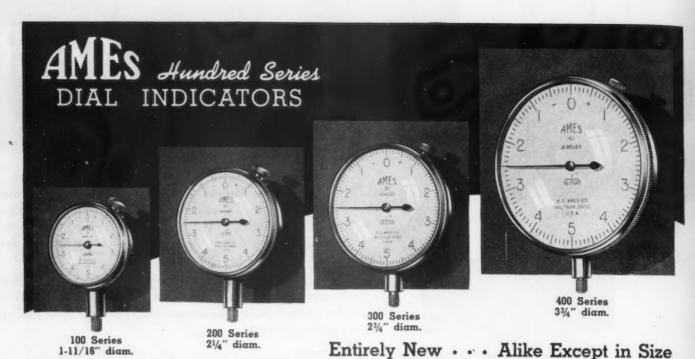
CINCINNATI DOUBLE HOUSING PLANERS—24" to

Complete detailed specifications available on request.



THE CINCINNATI PLANER CO.

Cincinnati, Ohio

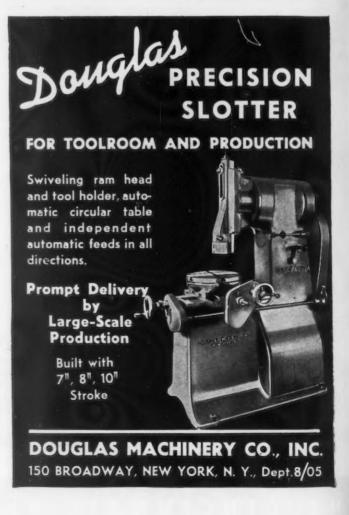


A complete line of modern indicators of the latest design and with exclusive features, developed from experience gained during a half century of manufacturing only the finest instruments of their kind. Superior to all others in quality, accuracy and durability, yet they cost no more. Investigate and compare them.

Catalog No. 52 on request.

B. C. AMES CO., WALTHAM, MASS., U.S.A.







TAFT-PEIRCE GAGES were called up for service long before Defense Programs were

headline news, to make certain that the first educational shell orders measured up to specifications. Today, Taft-Peirce Gages are serving as United States Inspectors General of arms, munitions, and aircraft production . . . helping to control dimensions, saving precious time. Of course, the Taft-Peirce Gage Division has grown to many times its original size. It produces one of the world's most complete lines of standard and special gages. Indeed, a precision gage is the house emblem for all of the varied products and services of this unique organization . . . Machine Tools, Small Tools and Gages, Air Service Equipment, Design, Development, Tooling, Contract Manufacturing. May we send you a catalog?

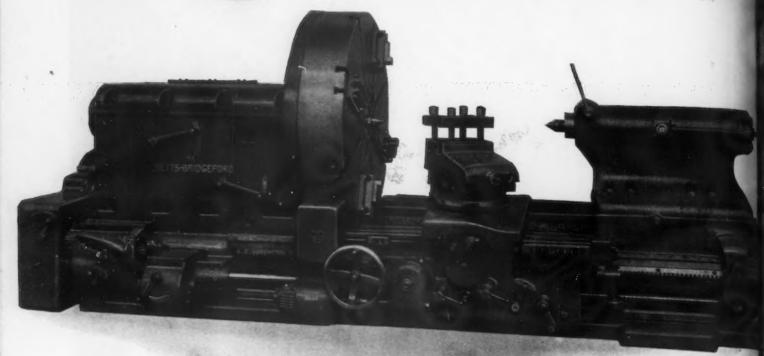
The TAFT-PEIRCE

MANUFACTURING COMPANY



Woonsocket, Rhode Island

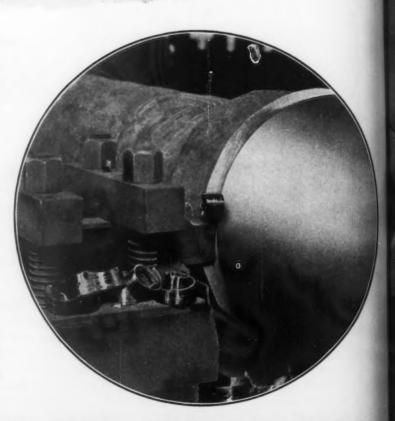
Big Lathes



When you see a big Betts-Bridgeford Lathe in action — see it take a husky roughing cut or a smooth finish cut, you will understand why these machines have such an enviable reputation for all around good performance.

Today these Betts-Bridgeford Lathes have the same rugged dependability as in past years and in addition they have every modern improvement for convenience of operation and speed in production.

For your defense jobs where the work is heavy and requirements call for accuracy and speed, it will pay you to look into the help these Lathes can give you.



BETTS . BETTS-BRIDGEFORD . NEWTON . COLBURN . HILLES & JONES . MODERN

CONSOLIDATED

ROCHESTER, NEW YORK



For Defense or Steelwelds Speed

In a wide variety of industries Steelweld Bending Presses are being worked 8 to 24 hours a day, week in and week out. They are speeding production and lowering costs on both DEFENSE and NON-DEFENSE work.

If you work with metal plate, whether mild steel, aluminum, or alloy, you should investigate the possibilities of Steelweld Presses. Light gauge furniture metal or one-inch plate are easily handled. For certain work such as straightening heat-treated armor plate, thicknesses up to three inches can be worked.

Steelwelds are extremely versatile and may be used for bending, forming, blanking, drawing and multiple-punching operations. A great many types of dies can be accommodated and quickly

STOKERS



This press has been in continuous service for 5 years, 8 to 24 hours a day, forming various parts for Iron Fireman Stokers and Heatmakers. At all times it has performed with complete satisfaction. The metal for these parts ranges from 24 gauge to 3/8-inch in thickness.

STEELWELD

THE CYRIL BATH CO. . GENERAL SALES AGENTS



TANKS

On heavy jobs like this, Steelweld Presses truly demonstrate their quality. Straightening heavy, heat-treated armor plate for tanks requires tremendous power. Every part of the machine must be built to take it.

Dozens of Steelwelds have been purchased for armor plate work because production-minded executives have found they will perform month in and month out, 24 hours a day, unflinchingly.



Non-Defense Production

inserted. Gauges and indicators provided make it a simple matter to obtain identical results repeatedly, with a set of dies.

Operators familiar with presses swear by Steelwelds. They find them easier and safer to operate. They appreciate the little physical effort required. They like the fact that very little maintenance is necessary.

Although nearly all Steelweld Presses now being built are for defense work we suggest that you get the facts on these machines now.

STEELWELD MACHINERY DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1115 EAST 283RD STREET • WICKLIFFE, OHIO.



E. 70th and MACHINERY AVENUE, CLEVELAND, OHIO

AIRPLANES

Steelwelds are a big aid to production at Lockheed Aircraft Corporation and many other important aircraft plants. 48 Steelwelds are now serving this great industry.

These machines are especially helpful in the forming of many of the difficult shaped parts involving complex bends and curves. They are extremely useful for work such as corrugations, J-sections, channels and angles.

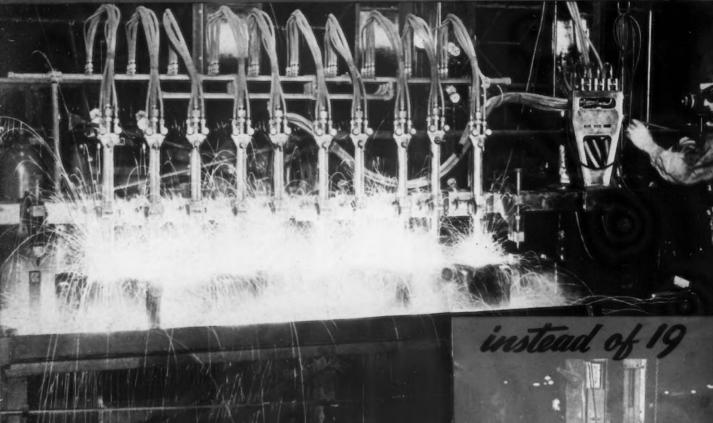


DESKS

Of the many presses at the Art Metal Construction Co., this Steelweld Press is the largest. It was purchased because of satisfactory performance of three other Steelweld Presses at Art Metal and because of features exclusive in Steelwelds which have proven advantageous.







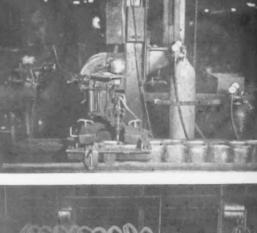


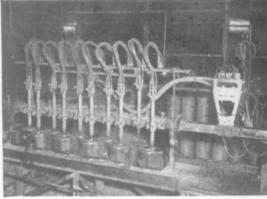
FLAME CUTTING STEPS UP PRODUCTION

Formed seamless tubular headers race off the production line at Combustion Engineering Company's Chattanooga, Tenn. plant at the un-

precedented rate of 100 a day - thanks to this Airco Oxygraph with its 10-torch set-up. This Airco achievement is making metal-working history—never before was it deemed practicable to employ such an elaborate multiple torch arrangement. Yet, when perfected by Airco every beneficial feature of oxyacetylene flame cutting is retained. Steel is accurately cut to the desired shape with amazing speed. No time is lost for sharpening or regrinding with this modern production cutting tool.

Defense production speed-up is the goal which Air Reduction is anxious and ready to help you attain, through its Engineering and Development Departments.





General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

MAGNOLIA-AIRCO GAS PRODUCTS CO.

AIRCO DISTRICT OFFICES IN PRINCIPAL CITIES





thing and Everything for GAS WELDING or CUTTING and ARC WELDING





Rams, Discharge of Water for Circular Orifices, Seamless Steel Pipe Properties, etc. Contains no advertising of Watson-Stillman Products. Write now for your free personal copy. THE WATSON-STILLMAN CO., ROSELLE, N. J.

SON-STILLM

Engineers and Manufacturers of Hydraulic Machinery and Equipment-Hydraulic Presses, Pumps and Jacks, Forged Steel Valves and Fittings

the rod comes out, it is coiled on reels which feed into automatic bullet coring machines. Precious min-utes are saved in this progress from billets to bullets.

The same engineering skill that produced this speed-up for Uncle Sam will be ready for application to your hydraulic machinery problems as soon as this war is over. Bulletin 110-A, a condensed catalog, shows what we can make for you as of today—and today is none too soon to arday—and today is none too soon to plan for your tomorrows. Why not get acquainted now?

1

sh

THE DIRECT-ACTING AIR CLUTCE

Universally accepted throughout the forging industry as the ideal clutch for high production forging equipment

Today, after 10 years of outstandingly successful performance on various types of heavy, high-production forging machinery, the Ajax Direct-acting Air Clutch is still unchallenged in ease and speed of operation, dependability and durability by other types of mechanical stop-motion mechanisms.

The instantaneous starting of the direct-acting air clutch on Ajax Forging Machines has resulted in as much as 25% increase in output on certain forging jobs, while its smooth cushioned engagement at high operating speeds has reduced down-time and over-all machine maintenance to a minimum. The double draft ventilation, a recent Ajax innovation which provides ample cooling to dissipate the heat, has immeasurably prolonged the life of the friction surfaces and removed all restrictions from high frequency of operation.

The Ajax Direct-acting Air Clutch has been the primary factor in the development of the Forging Press to its present day usefulness. It has made it possible to operate presses of heavy tonnage at twice the speed of the fastest presses of ten years ago, which has resulted in unforeseen advantages, greatly widened the field of practical press forging and tremendously reduced forging costs.

The superior ease of operation, speedier production, greater dependability and durability afforded by Ajax Air Clutch Forging Machinery re-emphasizes the wisdom of buying forging equipment purely on the basis of mechanical soundness. Write for new Bulletin 65-B on Ajax Air Clutch Forging Machines or Bulletin 75 on Ajax Forging Presses.

Buy Forging Equipment on the Basis of Mechanical Soundness. This 8 Inch, 470,000 pound Ajax Air Clutch Forging Machine is the Largest Ever Built with a One-Piece Integral Frame.

Introduced by Ajax in January 1932Proved by 10 years gruelling service



* AJAX

MANUFACTURING COMPANY
EUCLID BRANCH P. O. + CLEVELAND, OHIO
621 MARQUETTE BUIDDING CHICAGO, ELVINOIS
METAL WORKING MACHINERY

Forging Machines . Forging Presses . Forging Rolls . Bolt Heading and Forging Machines . Bulldozers . Hot Sawing and Burring Machines . Continued Motion Rivet Heading Machines . Glas House Wire Drawing and Cutting DII Machines and Straightening Machines . Wire Drawing Straightening and Cutting DII Machines

Here is what LINDE has to offer you

To help put across your Production Program in the Least Time . . . at the lowest cost

If your company has a heavy production or fabrication program—and a limited time in which to push it to completion—you will find the Linde organization ready to render helpful service. Linde has made available dependable products and processes which today are widely used to speed operations and improve results in the production, fabrication, and treatment of metals and metal products of almost every type. Important to you is the experienced service which the Linde organization offers to assure profitable use of these processes. Even if you have not had occasion in the past to take full advantage of Linde's services, we suggest that you call on us now if you feel we can help. You will find Linde capable and willing.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

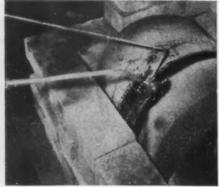
General Office, New York, N. Y. Offices in Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto

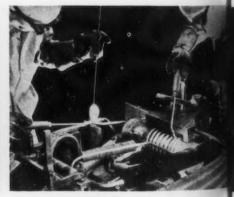
TIME SAVING PROCESSES



For shaping steel—Flame-cutting is one of the fastest methods of shaping steel—in straight lines, circles, or irregular shapes. It reduces, and in many cases completely eliminates, subsequent machining operations.



For maintenance—Welding and cutting offer many short cuts to the maintenance of plant and equipment; frequently save large sums by reclaiming damaged parts; and often help avoid costly shutdowns,



For fabrication - Oxy-acetylene production welding, both manual and automatic, is widely used. Linde's automatic electric process, "Unionwell' welding, is also used effectively in many industries.

LINDE OXYGEN · PREST-O-LITE ACETYLENE · UNION CARBIDE · OXWELD, PREST-O-WELD, PUROX

The words "Linde," "Prest-O-Lite," "Union," "Oxweld," "Prest-O-Weld," "Purox," and "Unionmelt" are trade-marks of Units of Union Carbide and Carbon Corporation.

A DEPENDABLE

SOURCE OF SUPPLY

Oxygen, Prest-O-Lite Acetylene, and Union Carbide are manufactured or warehoused at over 267 points throughout the country. Today, more than ever before, this complete distribution system is important. It reflects the efforts of the Linde organization over a period of many years to help assure the availability of these essential materials in periods of great need.

Apparatus and Supplies—The Oxweld line includes welding rods, fluxes, welding and cutting blowpipes, portable and stationary cutting machines, acetylene generators, bar and billet cut-off machines, descaling and flame-cleaning apparatus, and flame-hardening equipment. All Oxweld apparatus is built to deliver the best in quality, durability, and performance that over 30 years of manufacturing experience can give it.



ENGINEERING AND

PROCESS SERVICE



For treating metals—Oxy-acetylene fames are used to harden steel and iron parts; to remove scale from forgings and tastings; to clean structural steel before painting; and to anneal, bend, straighten, fam, and spin metals.

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UROX

APPARATUS . OXWELD SUPPLIES



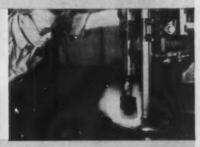
Service Operators - Linde operators bring on-the-job help to customers and show them how to use Linde processes.



Process Literature – Linde literature, and a monthly magazine, OXY-ACETYLENE TIPS, tell shopmen "how it is done."



Field Engineers Linde engineers can go into your plant and help develop new uses of the oxy-acetylene process.



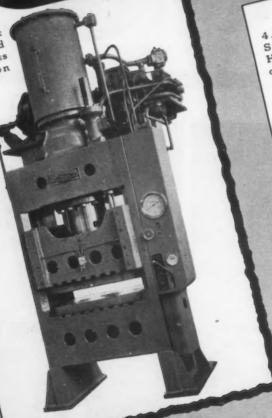
Research—From Linde's laboratories come new processes and apparatus ready to go to work for Linde customers.

HYDRAULIC & POWER

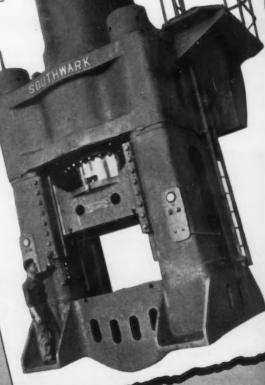
TOOL EQUIPMENT.

for the Metal Working Industries

Southwark self-contained Hyspeed press of 300-Ton capacity



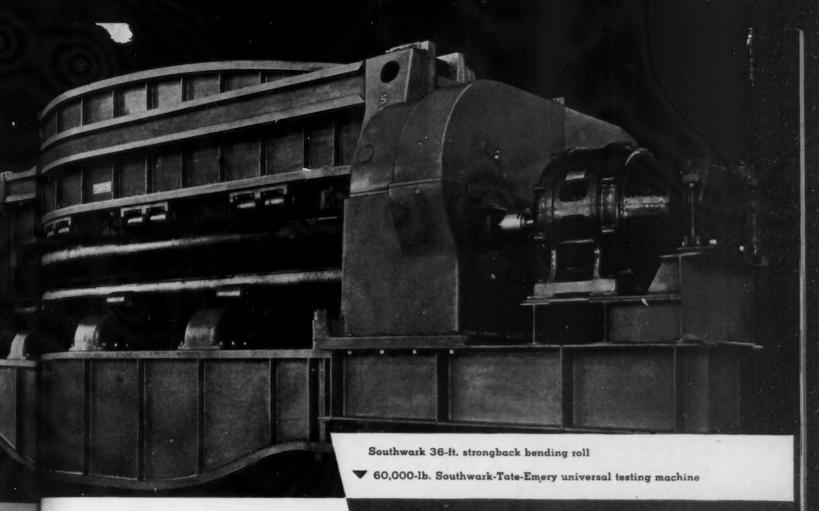
4,000.Ton
Southwark
Hyspeed
coining press



THE BALDWIN GROUP BALDWIN

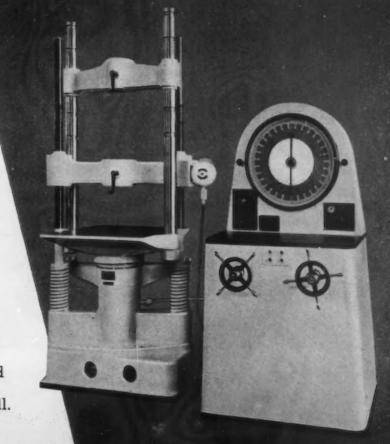
Division of

THE BALDWIN



Whether you need specially engineered equipment, or highly developed, heavy-duty standard machines such as Southwark builds in many types, for various sizes and kinds of work, it will pay you to secure Southwark's recommendations.

With 105 years experience in the manufacture of industrial machinery, with
unsurpassed shop facilities, Southwark
is in a unique position to meet your requirements for all types of hydraulic and
special machinery—large and small.



SOUTHWARK

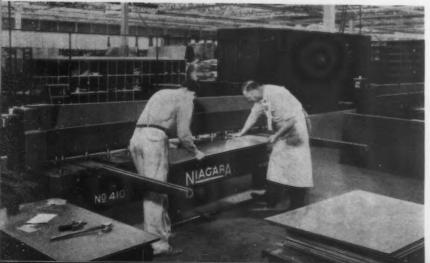
LOCOMOTIVE WORKS

PHILADELPHIA

IN DEFENSE PLANTS

PRODUCTION SPEEDS UP WITH
NIAGARA PRESSES

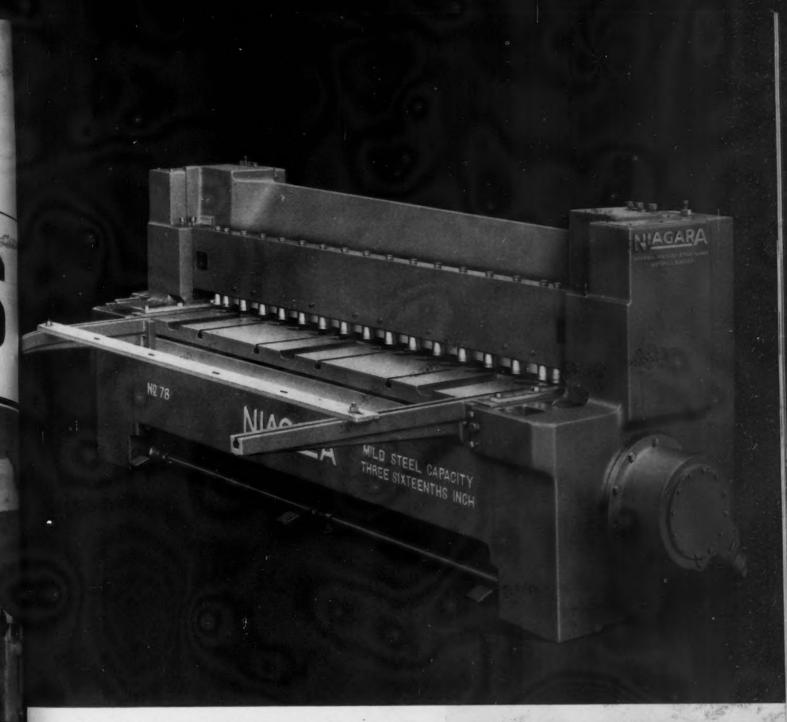




Manufacturers of airplanes, trucks, tanks and mon other types of fighting equipment are speeding up production with Niagara Presses.



View of part of the press room in one of America defense plants where Niagara Presses are worked 24 hours a day and seven days a week.



MORE PRODUCTION

and mor eeding

with NIAGARA

SHEARS

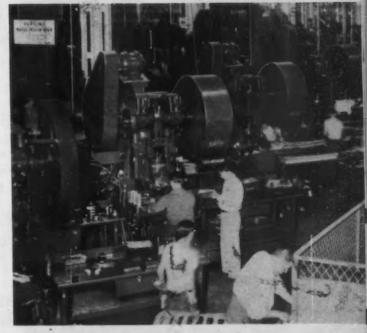
Latest type Niagara Power Squaring Shears are being widely used to increase production in leading defense plants.

f America Tre Work MAGARA MACHINE & TOOL WORKS

Branches:

New York

Cleveland



Part of a battery of 18 new Niagara Shears stepping up production in huge new airplane plant.



ERIE BUILDS Dependable HAMMERS



- AND AFTER THE EMERGENCY

high frequency will be standard for many quality production jobs.

The above equipment can be converted for brazing spiral wound tubing or electric parts merely by substituting a new ring.

It can be used for sintering carbide tools or for a 300 lb. brass melter by adding inexpensive coils. High frequency brazing makes a better joint than other methods. Also, it is faster, costs less and provides ideal working conditions.

The layout above, for instance, consists of a 50 kw high frequency generator and five small inductors and controls for silver brazing of the adapters on chemical shells.

It brazes at the rate of five per minute. After the surfaces are prepared, a ring of compound is placed in position, the assembly heated by placing it inside the induction ring, and then the parts are brazed, with no residue to clean up.

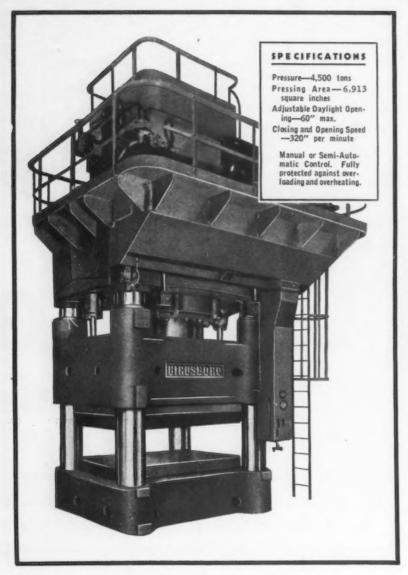
The heat is localized—the joint always the same—practically 100 per cent perfect—and the time is one third of that required for welding. Ajax-Northrup high frequency brazing is here to stay. The equipment you buy now can be converted to other uses—even melting if you wish. A few suggestions are given at the left.



AJAX HIGH FREQUENCY FURNACES

N O R T H R U P AIAX ELECTROTHERMIC CORPORATION, AIAX PARK, TRENTON, N.J.

ASSOCIATE COMPANIES: THE AJAX METAL CO. Non-Ferrous Ingot Metal for foundry use. AJAX ELECTRIC FURNACE CORPORATION. Ajax-Wyatt Induction Furnaces for melting. AJAX ELECTRIC CO., Inc. Ajax-Huitgren Salt Bath Furnace and Resistance, Type Electric Furnaces.



Playing a VITAL ROLE in America's Air Defense

One of several presses now at work in a large West Coast aircraft factory, this 4,500-ton Birdsboro Hydraulic Press forms numerous airplane parts that play vital roles in America's defense effort. This Birdsboro giant is put through its paces at the touch of a button, and provides

flexibility that makes routine production jobs of the airplane parts of today.

With that operating flexibility, Birdsboro Hydraulic Presses will also solve tomorrow's production problems economically. If it's a press problem, ask Birdsboro.

BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY

Plants at Birdsboro and Reading, Pa.

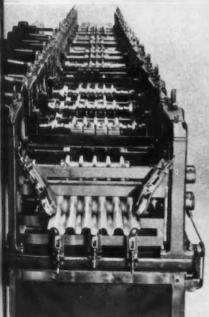
BIRD 5 BORD Hydraulic Presses

BUILDERS OF: HYDRAULIC PRESSES . STEEL MILL EQUIPMENT . ROLLS . SPECIAL MACHINERY . CRUSHING MACHINERY 432—THE IRON AGE, January 1, 1942









KANE & ROACH

PRODUCTION EQUIPMENT FOR AIRCRAFT BENDING AND FORMING

Leading aircraft and engine manufacturers are meeting their production schedules on sheet metal forming operations and on the bending of tubes and structural shapes — they are doing it with the Kane & Roach machines illustrated on this page.

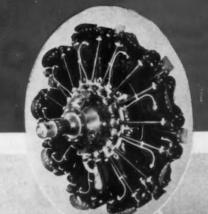
Similar standard and special K & R machines can advance your production plans. K & R engineers will cooperate with you to this end.

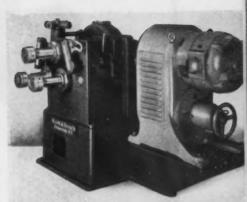
STRAIGHTENING ROLLS
BENDING ROLLS
COLD ROLL FORMING MACHINERY
GANG SLITTERS
SPECIAL METAL WORKING
EQUIPMENT

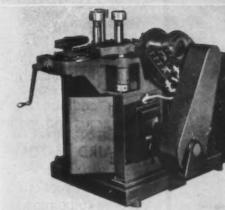


KANE 8 ROACH Syracuse, New York

Established 1887















AUTOMATIC MACHINERY **SINCE 1846**

BAIRD has specialized in the design and construction of high grade high production machinery such as is required



Bails Chain Buckles Terminals Radio Parts Clips, Hinges Bushings Hairpins Hooks and Eyes Connections Upholstery Nails Suspender Buckles Rings, &c., &c.

Screw Hooks and Eves Safety Pins Fasteners Springs Bottle Openers Novelties Chain Rollers Toilet Pins Paper Clips Thumbtacks Clothes Pins

This shows one of 12 different sizes of BAIRD Latest Design Automatic Four Slide Wire and Ribbon Metal Forming Machines, the most standard of such machines.

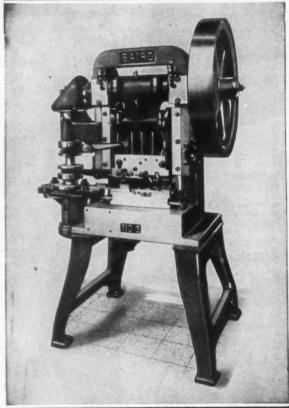
In addition we have many others too numerous and too varied to list.

BAIRD AUTOMATIC PRESSES. The picture shows a late design of press designed to lower production costs in cases where the article to be made requires several operations after blanking and where one press can be used on many such articles to be made in repeated runs and where a quick tool change is important in keeping the press in production the greatest length of time.

The tools are contained in one unit and we have made a tool change involving a down time of only four minutes.

BAIRD TUMBLING EQUIPMENT has been standard for about 40 years.

FIX THIS FIRMLY IN YOUR MIND.



A BAIRD Automatic Multiple Transfer Press. Built in 6 sizes.

BAIRD has other designs of Automatic Presses for other purposes.

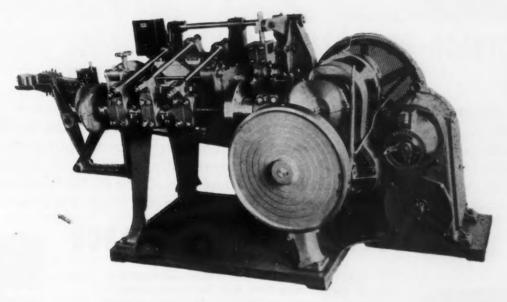
"Ask Baird About It"

THE BAIRD MACHINE COMPANY

BRIDGEPORT, CONN.

NILSON

Automatic Machinery for Swaging, Stamping, Piercing, Blanking, Forming of Coiled Metal



KEEP your Defense Production humming with Nilson automatic machinery. Nilson machines turn out the work faithfully, accurately and speedily. No bottlenecks where these machines are used.

The Nilson line includes machines for forming paper clips, buckles, gate hooks, coat and hat hooks, ceiling hooks, wire ears,

cable rings, screw eyes, sash chains, automobile side chains, flat open link chains, staples, cotter pins, hose clamps, etc. Nilson also makes wire straighteners, wire reels, frame bending machines and special presses.

Nilson has and will play a very important part in your Defense Production.

THE A. H. NILSON MACHINE CO. BRIDGEPORT, CONN., Q. S. A.



RESEARCH DEVELOPMENTS IN RESISTANCE WELDING FOR A NEW ERA IN PRODUCTION

The present demand for greater efficiency and speed in the production of defense materials and machines, has engaged the engineering genius of our nation. Future production, obviously, will embrace improvements in design

and manufacturing methods pre-induced by this emergency. Federal engineering accomplishments will eventually be utilized in the manufacture of products for the increased convenience and comfort of America.

FEDERAL IS ON THE MARCH



Rocker Type, Conventional or UNI-PULSE Spot Welder for welding Aluminum Alloys

The Federal Machine and Welder Company is today cooperating 100% with the government in supplying Resistance Welding Machines to vital defense industries. New metal fabricating problems are constantly being met and solved. The field and usage of Resistance Welding is being broadened with each passing day. Research and development never end. Federal is on the march. Send for Technical Bulletin No. 527 pertaining to Uni-Pulse Aircraft Spot Welding. Bulletin on Shell-Turning Equipment also available.



Rocker Press UNI-PULSE Spot Welder with Patented Low Inertia Head

THE SALES OFFICES IN ALL PRINCIPAL CITIES

OHIO



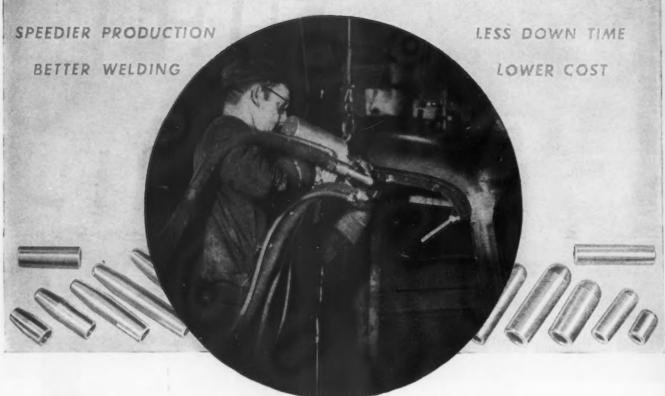
*Type SW Westinghouse Electrodes

J-70343



ACCESSORIES

MALLORY STANDARDIZED SPOT WELDING TIPS



The Men Who Man The Guns--

The men who man the high speed spot welding guns behind the front line of defense look to Mallory for long life tips!

These portable guns of production are busy night and day, as welders fabricate large assemblies for trucks, tanks, planes and other metal products needed on the front line. And portable guns assure better, faster welding even in restricted space.

Different jobs demand various types of guns. Some are used to weld inch sections, others for light gauge steels, including stainless, as well as aluminum and other non-ferrous metals.

Whatever the product, whatever the metals to be welded, Mallory has the right tip for the job. Mallory has consistently pioneered in improving resistance welding practice. You can be sure that a Mallory Spot Welding Tip will give you the highest possible production speed . . . the greatest number of welds between redressings . . . the maximum number of spots before replacement is necessary . . . and thus better welding at lower cost.

Particularly important, too, is the fact that Mallory's standardization program assures prompt shipment of the tips you need for your job. Specify Mallory now... and get the spot welding tips you want when you want them.

P. R. MALLORY & CO., Inc., INDIANAPOLIS, INDIANA Cable Address-PELMALLO



MALLORY Resistance Welding Data Book

Be sure your engineering files include this factual, complete treatise on resistance welding practices, alloys and specifications. Write for your copy today.

RESISTANCE WELDING MALLORY

STANDARDIZED ELECTRODES

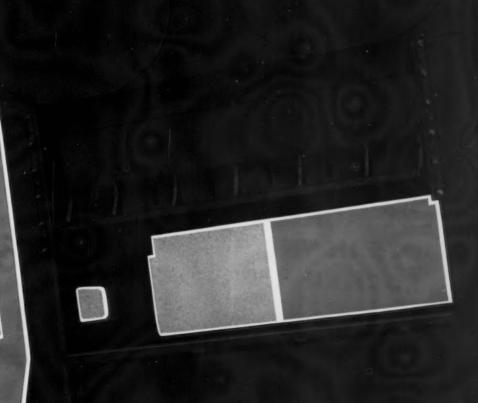




Modern Cleveland Single Point Press. 36" between the uprights 12" strake—250 tons capacity.



Modern Cleveland Two Point Fress. Bed Area 60" x 136"-24" strake-



This series of Modern Cleveland Presses embraces three types known as Single Point, Two Point and Four Point, and each type can be furnished in sizes and capacities to suit and Point and Four Point, and each type can be furnished in the box type crown trequirements. The gears, which run in a bath of oil, are located in the box type crown requirements. The gears, which run in a bath of oil, are located in the box type crown to presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit, and any of these Presses can be furnished with either a together with the drive unit.

Modern Presses THE CLEVELAND PUNCH & SHEAR WORKS COMPANY Cleveland, Othio



Now, with war, arsenals and guns have to be kept filled all the time. And that calls for more work than ever before, from all Defense production machines. So fit them to count with Veeder-Root Devices that are quickly and easily attached. Then you will get a continuous flow of facts-in-figures that will help you keep production up where it belongs, help you to spot trouble and inefficiency promptly, help you to crack down on waste, spoilage, delays. Remember:

The more complete you make your Control-by-Count, the more shots you'll put in America's locker... and we've got to fire the most shots in order to win this war.



HARTFORD, CONN., U.S.A.

OFFICES IN Boston, Chicago, Cincinnati, Cleveland, Detroit, Greenville, S. C., Los Angeles, New York, Philadelphia, Pittsburgh, St. Esuis, San Francisco, Montreal, Buenos Aires, Mexico City, London, Sbanghai, Melbourne. In England: Veeder-Root Ltd., Knightou, Radnorshire. In Canada: Veeder-Root of Canada, Ltd., Montreal.



HydrOILics Helps to Keep 'em Glying!

Like an oversized stethoscope, HSPT2 checks the pulse of airplanes on the ground, for safety in the air.

Built for the U.S. Army Air Corps, the HSPT2 HydroILic stand tests spark plugs at an average speed of only 30 seconds each—and at any voltage or pressure encountered in actual flight.

The tester develops pressure up to 750 pounds per square inch within 15 seconds, and it will maintain that pressure for a full minute!

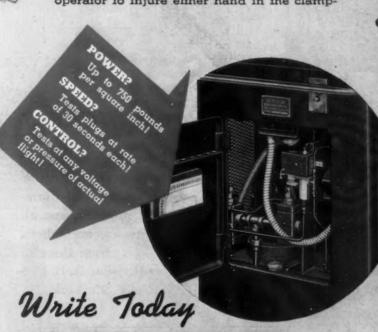
Its operation is simple. A spark plug is seated in one of the adapters, and action of the HydrOILic cylinder clamps the plug in an airtight chamber. Then, with the voltage and pressure set its performance is recorded. That's all—the whole test is swift, accurate, dependable.

Safety controls make it impossible for the operator to injure either hand in the clamp-

ing mechanism, or to handle plugs while the electric circuit is completed.

The HSPT2 demonstrates the high versatility of HydrOILics — how HydrOILics delivers more efficient POWER, SPEED and CONTROL on an unlimited variety of production jobs. You can easily learn how much it can do for you, without any obligation. Just phone your Denison representative or write us foday!

THURMENT APPLIED LICA



for Bulletin M-2 to learn more about the new jobs HydrOlLics is doing—where industry and defense are finding more effective POWER, SPEED and CONTROL in production. It will give you some new ideas on oil hydraulics and its applications.

CHESTNUT. ST.

108 W.

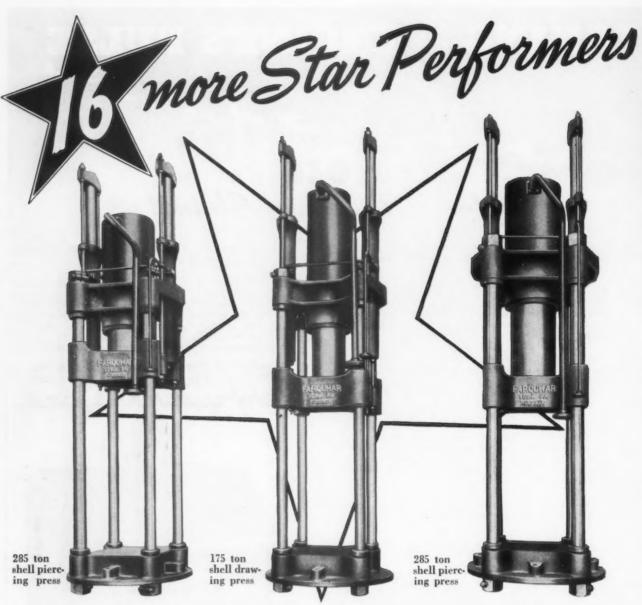


The DENISON ENGINEERING CO.

THE IRON AGE, January 1, 1942-441

OHIO

COLUMBUS,



join the ranks of AMERICA'S shell makers

JUST COMPLETED, sixteen Farquhar hydraulic presses like these are now helping the nation gird for a mighty war effort. Shell piercing, nosing and drawing presses are only part of the complete array of high speed units Farquhar is supplying for all industrial and ordnance operations. Smokeless powder presses; blocking, graining and finishing presses; shell and car-

tridge case piercing and drawing presses; gun straightening presses; forging and extrusion presses; self-contained blanking and forming presses for the aircraft industry, and all types of metal working presses, are others. All sizes, all capacities . . . from three to 7000 tons. Hydraulic Press Division. A. B. Farquhar Co., Limited, 175 Duke St., York, Pa.

FARQUHAR

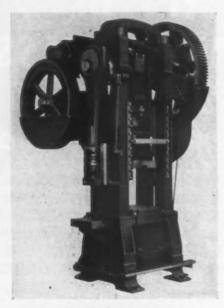


Hydraulic Presses

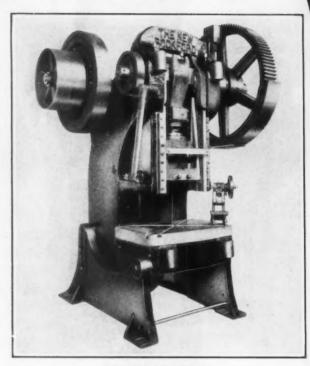


NEW ROCKFORD PRESSES

Built for Exceptional Service



THE TRIMMING PRESS GROUP—
100 to 400 tons pressure—
Built-up tie rod frames



THE INCLINABLE GROUP—
8 sizes, 16 to 100 tons pressure

Rockford presses embody every modern, worth while feature; oversize frames, crankshafts with 50% heavier crankpins, bronze bearings, automobile type, self equalizing brakes, etc.

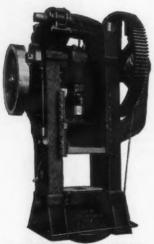
-A complete engineeringservice is at your command-



STRAIGHT SIDE DOUBLE CRANK GROUP— 100 to 400 tons pressure Widths up to 96" Built-up tie rod frames



STRAIGHT SIDE GROUP— Showing friction clutch

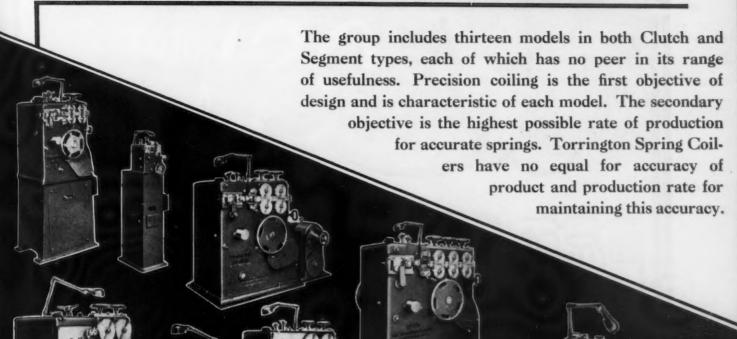


THE STRAIGHT SIDE GROUP— 100 to 400 tons pressure— Built-up tie rod frames

ROCKFORD IRON WORKS, INC.

648 RACE STREET
ROCKFORD, ILLINOIS, U. S. A.

A FAMILY OF SPECIALISTS



"Since 1937 Torrington has built and sold more automatic spring coiling machines than all other manufacturers combined."

SPRING COILING MACHINES

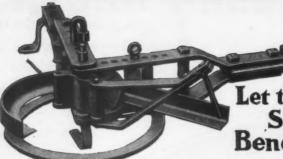
TURRINGTON

MANUFACTURING COMPANY, TORRINGTON, CONN.

The HOSSFELD UNIVERSAL IRON BENDER

Potented in the U.S. and Canada

Bends Pipe, Bars and Angle Iron



Let the Hossfeld Bender Solve Your Bending Problems

No other Bender on the market like it.

This Powerful, Steel Constructed, Wrenchless, Universal, Pipe, Bar and Angle Iron Bender, will neatly, quickly and accurately turn out most any kind of a bending job that ever comes up, either in maintenance or production work — such as Eye Bolts, "U" shapes, "S" shapes, Links, Circles, Offsets, Braces, Cranks, etc. It will also roll eyes on flat stock for Automobile Springs and the like.

It does a perfect job on Pipe work, bending to any degree or to a continuous coil without flattening it or splitting the seam.

The bending of Angle Iron is an exceptionally wonderful feature of the machine. It

The bending of Angle Iron is an exceptionally wonderful feature of the machine. It forms a smooth perfect curve or circle of any radius desired, without twisting or distorting the stock in the least. It also bends Sharp Square bends on notched Angle Iron.

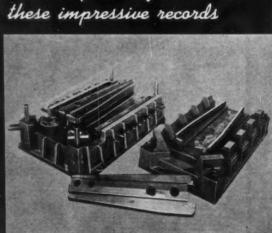
The machine is built in two sizes. The larger size bending up to 2-inch standard pipe, $4^{1}/_{2}$ -inch flat bar stock, or $2x2x^{3}/_{6}$ -inch angle iron, cold. There are thousands of these machines in use by all classes of trade in the U. S., Canada and other foreign countries.

Write for descriptive literature and prices.
MANUFACTURED ONLY BY

Hossfeld Manufacturing Co

CITUD CITUDO
mples of Bar Bending Samples of Pipe Bending





Then duplicate for war work

At Left . . . Refrigerator Top Die. Made of long life Strenes Metal and calling for a 3" double-cornered draw. Close to 2,000,000 stampings from .050 material. ½ the stoning and polishing. Metal finishing and breakage practically eliminated following the changeover from a die of conventional metal. Specify Strenes Metal for Long Life and Low Maintenance.

At Right ... Tractor Top Die. 1/3 less expensive for two reasons: 1. 75% of total weight of 17,000# made of low cost Strenes Metal, important raw stock saving ... 2. Because collapsible die, pressure pad, and cam blocks were so closely cast to shape, 500 hrs. machining time eliminated. Specify Strenes Metal for Low Cost. All castings cleaned by Hydroblast.

THE ADVANCE FOUNDRY CO., DAYTON, OHIO

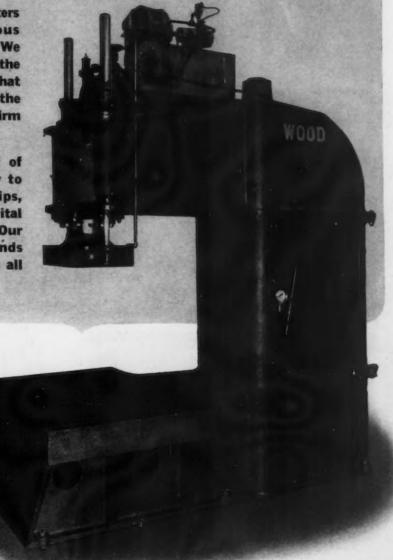
STRENES METAL . . . FOR DRAWING AND

FOR 139 YEARS...

This new year, R. D. Wood enters its 139th year of continuous service to American industry. We have enjoyed working under the American system and feel that we have contributed a share to the American way of life. It is our firm intention to continue to do so.

Practically our entire output of presses now goes exclusively to those who are building ships, planes, ordnance and other vital needs for American defense. Our engineering department stands ready to consult with you on all hydraulic press problems.

This 250 ton joggling press with self-contained pumping unit is one of three recently supplied to an eastern shipbuilding company. Bed size 8'0" x 6'0". Ram stroke 30".



R.D. Wood Co.

PRESSES AND VALVES
FOR EVERY PURPOSE

THE IRON AGE, January 1, 1942-447

THE MODERN HAMMER THAT SPEEDS-UP FORGING

MOTOR DRIVEN AIR OPERATION **INSTANTLY VARIABLE** STRIKING FORCE

Install the Nazel Hammer for today and tomorrow ... to meet your present defense requirements . serve in your future peacetime production set-up. It is readily adaptable to plant rearrangement - is easily moved and useable anywhere there's electric power available. Consumes power only when doing useful work - independent of any auxiliary equipment. Versatile - able to handle so broad a range of work, they unquestionably will do tomorrow's job.

And, the same NAZEL speed and precision that satisfies your present need for rush production will be a vital factor in your future competitive position!

Why buy less than these advantages?

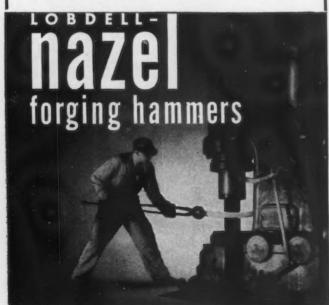
GIVES YOU SEVEN DECISIVE ADVANTAGES

- Self-Contained Hammer and Compressor all in
- 2. Consumes Power Only
- When Operating!
 Gives a Powerful Squeezing Blow!
- Positive in Action! Simply Controlled!
- Heavy, Rigid, Durable Construction!
 Efficient Fewer reheats, less labor and lower costs!



FREE

New NAZEL HAMMER BOOK shows the principle of operation and illustrates NAZEL Hammers on the job in a variety of industries. A copy is yours upon request on your letterhead.



NAZEL HAMMER DIVISION

LOBDELL CAR WHEEL CO.

WILMINGTON, DEL

Also makers of the Lobdell-DILL Traveling Head Slotter . a veritable machine shop in one tool. Ask about it.



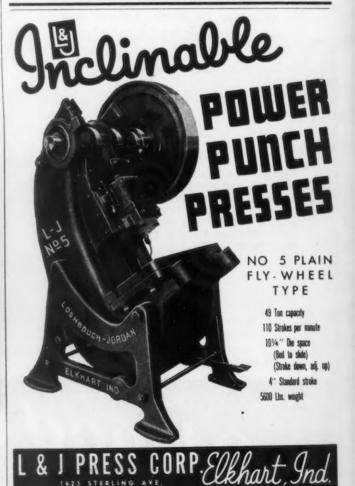
You can make non-porous, homogeneous die castings of magnesium, brass, and aluminum which pass 100% X-ray inspection with less than 1% rejections. Lester-Phoenix Cold Chamber Machines give such results consistently in the production of incendiary bombs, airplane parts, and other items which demand density, accuracy, and soundness. You get a higher output of salable castings which approach forgings in all-around utility. Investigate Lester-Phoenix' many exclusive features today.

LESTER PHOENIX

Write for your copy of Bulletin A-1, just off the press.

THE PHOENIX MACHINE COMPANY 2711 Church Avenue . Cleveland, Ohio

Mention Item NED-2089 when writing



ACCESSORY EQUIPMENT EQUIPMENT PARTS



OUR PLEDGE FOR 1942

• To win the war is the one job ahead of us. To achieve that aim, we must and shall, have "all out" production.

Probably there is no single item made by American Industry more generally used in all implements of warfare than bolts, nuts and other industrial fastenings.

So that there shall be no moment of delay in armament production due to lack of these parts—our product—record-breaking tonnage must be produced and allocated to the points

RUSSELL, BURDSALL & WARD

PORT CHESTER, N. Y.



of most vital need in accordance with their importance to the national emergency.

Because this is our biggest problem today, we now are thankful that during the past 5 years we have, without interruption, carried on a definite major program of expansion and rehabilitation which has been the greatest in our 97 years of business.

To win this war, to achieve this necessary "all out" production, we pledge the greatest effort of our history.

BOLT AND NUT COMPANY

ROCK FALLS, ILL.

2D

CORAOPOLIS, PA.





Upper photo courtesy of The Warner & Swasey Co., Cleveland, Ohio Lower photo courtesy of The John Bertram & Sons Co., Ltd. Dundas, Ont., Canada.

Recently it was planned to equip a large plant with over 100 swinging jib cranes, each of which would give coverage to a small circular area. This scheme would not permit transportation between areas. A study revealed that 25 single-leg gantry cranes would give

Similarly in other plants, gantry cranes have eliminated the need of purchasing one or more large overhead cranes. As a result, appreciable savings have been made in original cost, because several gantry cranes can usually be bought for the price of one heavy overhead crane. And of significant importance, better handling service is provided.

Why not check into the possibilities offered by inexpensive Cleveland Tramrail single-leg gantry cranes today? They are built for hand or electric operation in capacities up to five tons.

CLEVELAND TRAMRAIL DIVISION

THE CLEVELAND CRANE & ENGINEERING CO.

1115 EAST 283 RD ST.

MANUFACTURERS OF . CLEVELAND CRANES . CLEVELAND TRAMRAIL . STEELWELD BENDING PRESSES

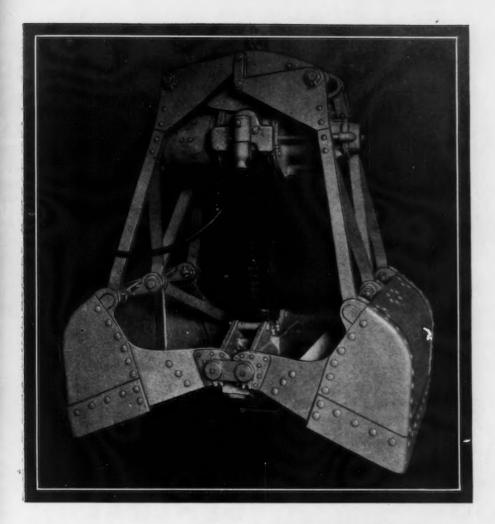


for free capy on your company letterhead.



CLEVELAND TRAMRAL

OVERHEAD MATERIALS HANDLING EQUIPMENT



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PRESSES

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Built to lick TOUGH bucket jobs!

The only single-line "book-on" bucket of its kind, this Hayward Electric Motor Clam Shell can be put into service instantly for handling any diggable material. It is ideal for use in plants where overhead cranes are installed.

Simply hooking the bucket on the crane and plugging in the electric feeder cable are all that is necessary to put this bucket to work. No special circuits or controllers are needed. Nor are there any latches, hand lines, ropes or limit switches to bother with.

Simple, safe, sturdy, this Hayward is a match for industry's toughest bucket jobs. Ask for Bulletin 705.

THE HAYWARD COMPANY 40-50 CHURCH STREET, NEW YORK



LEFT: Hayward's latest Clam Shell Bucket, Model E-16. Power-wheel design. Constant closing power throughout the digging operation. Capacity loads every time all the time. Ideal for gravel, sand, broken stone, cement clinker. Ask for Bulletin 696.

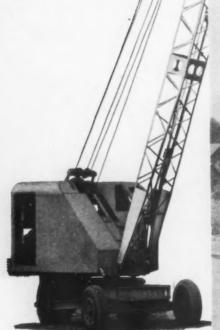
RIGHT: Hayward's E-15 Light-Weight Grab Bucket for coal and coke. Rugged strength, Bucket weight matches load handled, pound for pound in many materials. Saves wear and tear on equipment. Savespower, too. Ask for Bulletin 670.



Hayward Buckets

2 NEW

RUBBER-TIRED CRANES ONE-MAN-CONTROLLED ONE-ENGINE-OPERATED





OSGOOD MOBILCRANE



GENERAL SUPERCRANE

SAFER - MORE EFFICIENT THAN A TRUCK CRANE

No danger to cab or driver — no confusion or lost motions because all operations are performed by one operator... from one cab... with one set of controls — all the economy and efficiency of a single motor—low center of gravity... Less danger of tipping.

FASTER -- MORE STABLE THAN A CRAWLER CRANE

Higher travel speeds — quieter — smoother operation — no damage to floors or roadways. Long wheelbase with wheelmounting equally strong throughout its entire length — ability to pick and carry a load over front, side or rear. Here are cranes engineered for the job!

We invite you to thoroughly investigate the merits of these fine new cranes NOW. The demand for National Defense purposes is very heavy at present, but eventually—soon we hope—we shall be in shape to serve you.

THE OSGOOD CO.

MOBILCRANES

THE GENERAL EXCAVATOR CO.

MARION, OHIO

SUPERCRANES

READY-DOWER

SAVE TIME—SAVE MONEY

GIVE BEST OVERALL PERFORMANCE



PROVIDES Continuous Power

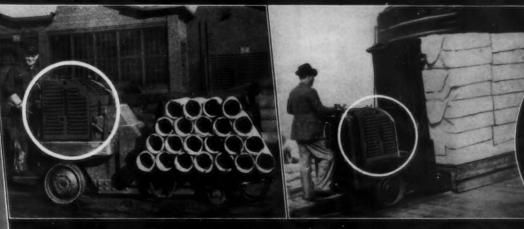


PROVIDES Peak Performance

READY-POWER (Gas-Electric) units on new or existing electric truck equipment handle more leads per hour per day and per year than the same equipment battery powered. This means a saving in time as well as a saving in money by accomplishing a given amount of work in less time at a lower cost per ton handled. Thousands of users in all lines of activity have proven this, With teday's higher wage rates and the accent on performance, be sure you get the best.

For new or existing electric fracts we manufacture a complete line of Gas-Electric power units—not complete trucks. You can secure new trucks complete with SEADY-POWER from all truck manufacturers as we can supply you READY-POWER units to regime betteries for the trucks now in your plants. Prempt delivertes are now possible.

Write for information mentioning type on nase tracks contemplated or make year type now operated.



PROMPT
DELIVERIES
NOW!

THE READY-POWER COMPANY

3841 GRAND RIVER AVENUE, DETROIT, MICHIGAN, U.S.A.

Diag PRODUCTION CIRCUITS

WITH WESTINGHOUSE SAFETY SWITCHES

SAVE MAINTENANCE EXCLUSIVE DIAMOND-POINTED BREAK JAW KEEPS ARCING OUTSIDE CONTACT AREA



The ordinary way.



SAVE POWER ONE-PIECE COPPER CONSTRUCTION REDUCES HEAT LOSS



e-piece copper construction saves money from power loss. Westing-use safety switches have from 2 to 7 less contact points per pole

THESE FEATURES MEAN EASIER INSTALLATION -LOWER MAINTENANCE

Concentric knock-outs, top, bottom and both sides • Solderless lugs • Reinforced fuse clips assure maximum fuse contact and reduce heating.

Warpproof, moistureproof Micarta crossbar • Steel parts cadmium-plated to resist rust and corrosion • Wearing parts of operating mechanism heat-treated for longer life . Door can be padlocked to prevent unauthorized operation • Switch operating mechanism inside handle on Type A leaves ample wiring space, prevents damage to conductor insulation • Non-carbonizing composition base · Quick-make, quick-break on Types A and C minimizes switch burning.

WESTINGHOUSE ELECTRIC & MFG. CO. EAST PITTSBURGH, PA.

J-21147



Westinghouse



FOR PRODUCTION INSURANCE

buy Westinghouse

TIME SAVERS FOR INDUSTRY



WESTINGHOUSE "DE-ION" LINESTARTER

Magnetic Across-the-line Starter CLASS 11-200

Push-button operated—builtin or mounted separately.
Small, compact construction
saves space. Bi-metal overload protection — hand or
automatic reset. "De-ion"
protection for contacts reduces maintenance. Vertical
magnet operation speeds contact opening and prevents
accidental operation.



WESTINGHOUSE AB-I BREAKER

For Circuit Protection

Eliminates switch and fuses. Bi-metal overload protection. "De-ion" protection for contacts. Saves maintenance time and production time—circuit outages can be restored by operator. No live parts exposed. Door opens only when switch is in "Off" position. Occupies approximately 40% less space than switch and fuses.



WESTINGHOUSE COMBINATION LINESTARTER

For Motor Control and Circuit
Protection
CLASS 11-206

Magnetic motor starter—motorcircuit switch—motor overload
protection—nofuze circuit protection—all in one unit. Bi-metal
gives permanently accurate overload protection. "De-ion" quenchers protect contacts—save maintenance. Four-in-one Unit saves
installation time—saves space—
saves wiring—provides greater
protection for operators.



WESTINGHOUSE "DE-ION" MOTOR WATCHMAN

Manual Across-the-line Starter for Motors up to $7\frac{1}{2}$ hp. CLASS 10-100

Quick - make, quick - break toggle action prevents "teasing" contacts. "On." "Off," "Tripped" positions self-indicating. Bi-metal disc overload protection. "De-ion" protection for contacts. Ample wiring space. Rust-resisting parts. Silver contacts. Keyhole mounting for quick, easy installation.

Call your nearest Westinghouse Sales Office or Distributor

See are relief of the Internations Heating & Ventilating Exposition. Commercial Merourn, Philadelphia, P. January 26-30, 1942.

Motors and Control

PRECISION BEARINGS



Separable (Magneto)
Ball Bearing



Single Row Ball Bearing

108 DISTINCT SERIES

BALL, ROLLER AND THRUST

OVER 3000 SIZES

1/8" to 21" Bore — Metric and Inch Sizes

Write for the Catalog and Engineering Counse

NORMA-HOFFMANN BEARINGS CORP'N .- STAMFORD, CONN., U. S. A.

"WVRMA-HVFFMANN"



Litro ("CL") Compositio



Double Row Self-Aligning



Shielded Type Single Row Ball Bearing



Single Felt Sea Ball Bearing



Double Felt Seal



9000 Series (Feltless Sealed Ball Bearing



Cartridge' Fully Seale Refillable Type Ball



Double Row Ball Bearing



Extra Light Type



Duplex Type (Two Direction) Angular Contact
Ball Bearing



Angular Contact B Bearing



Single Direction Ba Thrusi Bearing



Standard Cylindrica



Double Row Self-Aligning



Full Type (Retainerless) Cylindrical Roller



xtra Light Cylindrica



wo Lipped Cylindric Roller Bearing



electric industrices trucks when you use

PHILCO BATTERIES BATTERIES

PHILCO, Storage Battery Division Trenton, New Jersey

This GROWS LOUDER EVERY YEAR



Industry approved the onepiece Westinghouse frame in 1933—and likes it better than ever today

"No sag or twist in CS Motor Frames" is an old story by now. We said it in 1933—and proved it by letting a 10-hp motor bearing support 350 pounds, 3½ feet out from the frame.

Industry liked the idea then—and ordered CS Motors to get the benefit of a rigid cast

frame, along with those other important benefits—sealed - sleeve bearings and Tuffernell insulation.

Industry likes the idea better than ever today—judging by the acceptance of the one-piece cast frame.

When we first announced it over a decade ago, the CS Motor with its cast frame, sealed-sleeve bearings and Tuffernell insulation was a big improvement over previous motor designs. Today, with the years of experience and improvement that have gone into it, it is better than ever.

Westinghouse



The integrally cast frame on this Westinghouse CS Motor protects the electrical elements fully against twisting strain and vibration.

RENEWAL PARTS AND SERVICE

Not only for current models, but for any Westinghouse Motor or control device ever built, Westinghouse assumes the responsibility of providing renewal parts. They are made with the same tools as the original equipment and to the same rigid standards. Parts

1-

are therefore fully interchangeable and maintain the original performance.

The 34 district manufacturing and repair plants are so located throughout the United States that parts or service are available overnight wherever your plant may be.



SEALED-SLEEVE BEARING WITH FELT GASKET AND VESTIBULE SEAL

Oil is sealed in—dirt and dust are sealed out. Only in Westinghouse CS Motors do you get this dual protection.



TUFFERNELL INSULATION

Includes the Westinghouse insulating slot cell, plus taped end turns giving extractrength at the most vulnerable spots. The final dipping and baking completes the protection which resists the abrasive wear of dust, dirt, and grit under the most unfavorable conditions.

HIGH FREQUENCY TEST GIVES EXTRA PROTECTION AGAINST INSULATION FLAWS

In addition to the standard A.I.E.E. tests each Westinghouse motor must pass the Westinghouse Radio Frequency Test—the only test that detects flaws and weak spots between each individual turn of the windings.

J-21175

Type CS Motors



WHEREVER WHEELS TURN

There's need for SPENCER VACUUM

The wheels of industry are producing mountains of waste and acres of dust these days, with less idle time for cleaning and fewer men to do the work.

HERE'S HOW SPENCER VACUUM CLEANING SAVES MEN...SAVES TIME...SAVES MATERIALS

hours with smaller cleaning force.

Removes dust—underfoot or from walls, pipes and overhead.

Cleans machinery—inside and out, without scattering dust.

Ask for Bulletin 1021 on Portables or 1251 on Spencer Stationary Vacuum Cleaning Systems.

Removes debris during working Reclaims valuable metals, powders, chemicals.

> Improves working conditions health, safety, fire, explosions.

> Cleans finished goods, cartons; trucks and freight cars.

POWDER

THE SPENCER TURBINE COMPANY, HARTFORD, CONN.

PORTABLE CLEANERS 3/4 TO 71/2 H.P.: STATIONARY SYSTEMS UP TO 100 H.P.

GER VAGUU

IT CLEANS

FLOORS LEDGES MACHINERY PIPES WALLS

IT RECLAIMS

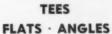
CHEMICALS FUEL METALS RUBBER SAND

IT REMOVES

GRIT LINT PAPER VERMIN

RINGS

Rings and Flanges Rolled from Standard Bar Stock-



YOU can have rings and flanges that are true to size in perfect circles up to any diameter—rolled from standard flats, rounds, squares, angles, tees and channels in light or heavy sections—welded and finished at the joints—in steel or non-ferrous metals.

These accurate rings are available to you at an economical price because we have specialized for 30 years in this one line of production.

Send us your sketches for an estimate.

ROUNDS · SQUARES
CHANNELS



FLATS - BANDS



ANGLES - Leg Out



ANGLES - Leg In

KING FIFTH WHEEL COMPANY
2915 N. SECOND STREET PHILADELPHIA, PA.

OF FIRST IMPORTANCE-

Darign

THIRTY-EIGHT years of Roller Bearing manufacture have proved that design is the most important element in bearing.

Likewise, the use of many millions of Bower Roller Bearings as original equipment over a period of many years in America's leading large-production automobiles has proved the correctness of BOWER DESIGN.

Bearing users will appreciate that the exacting standards of the automotive industry and the severe usage of bearings in automobiles offer a challenge that no roller bearing can meet unless it possesses the highest degree of quality known to the bearing industry.

One of the secrets of Bower's leadership is the fact that its technical men have never waited upon the ingenuity of other men. Bower engineers push relentlessly ahead—far beyond the needs of the moment—to make new technical discoveries and to apply them always in ADVANCE.

This Tapered Roller Bearing is a leading example of Bower design. It embodies important advantages that no other bearing possesses—advantages that Bower engineers discovered and incorporated ahead of all others.

For more detailed information on Bower design, ask us for a copy of the folder, "Secrets of Bower Roller Bearing Design and Quality."

ROLLER BEARING CO

Full Line Contact of Final-Finish Surfaces Coincide on a Common Apex. Two-Zone Contact of Rail End Insures Roll Alignment. (Patented Dec. 6, 1930, Patent No. 1784914.) Ground Radius of Cone Flange Prevents Noise and Chipping.



A 4

Bower Finish Like
A "Face-Lifting" Operation

1. ROUGH GROUND—Photomicrograph—25 diameters—showing amorphous film with roughness of approximately 15 micro-inches (millionths of an inch). 2. FINISH GROUND—More but finer scratches—surface finish of approximately 10 micro-inches composed of amorphous metal left by finish grinding—Photomicrograph of 25 diameters. 3. FINAL FINISH—25-diameter photomicrograph showing amorphous metal and grinding marks removed, baring hard surface and smoothness of approximately 3 micro-inches—scratches below surface.



NOW that continuous and efficient production is more important than ever, are you cashing in on the advantages of Preformed "HERCULES" (Red-Strand) Wire Rope? Actual records show that its easy handling, smooth spooling and long life mean a definite saving in both time and money.

When you buy Preformed "HER-CULES" (Red-Strand) Wire Rope,

you get a Preformed wire rope of the very highest quality — not only as to quality of material, but fabrication as well. As it is furnished in both Round Strand and Flattened Strand constructions, there is a right rope for every heavy duty purpose.

Why not take advantage of the time and money saving possibilities of Preformed "HERCULES"? Try it, then compare its performance record with that of any other rope you have ever used.



We especially recommend the Preformed type of "HERCULES" (Red-Strand) Wire Rope for use on backfillers, bulldozers, carryall scrapers, clamshells, conveyors, cranes, draglines, dredges, hoists, shovels, skimmers and trench hoes.

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS

5909 KENNERLY AVENUE

NEW YORK ' ' 90 West Street
CHICAGO ' 810 W. Washington Blvd.
DENVER ' ' 1554 Wazee Street

PORTLAND ' 914 N. W. 14th Avenue
SEATTLE ' 3410 First Avenue South



"THE RINGS ARE THE WHY"

AMERICAN originated the rolling ring principle for highest efficiency in crushing, and today AMERICAN methods produce, through long experience, the outstanding equipment in the field.

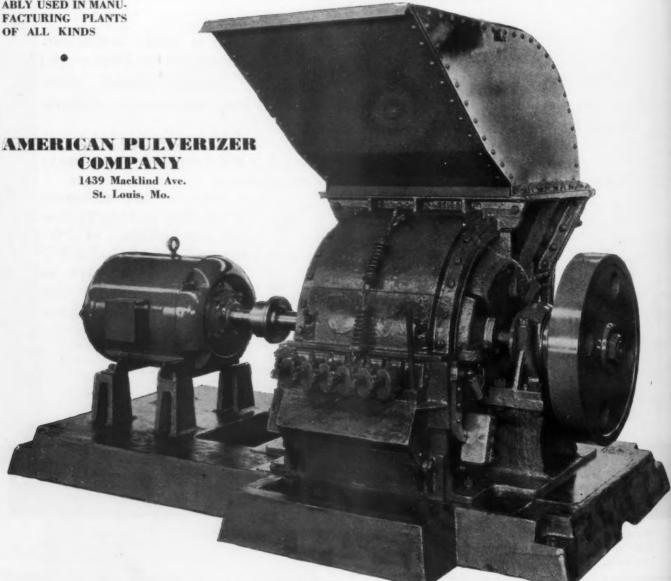
ORIGINATORS

OF THE ROLLING RING CRUSHER PRINCIPLE. PROFIT-ABLY USED IN MANU-FACTURING PLANTS OF ALL KINDS

Changing WASTE to PROFIT

Every automobile manufacturer knows that chips and short turnings are more profitable than long turnings. For example, one plant installed three No. 3800 AMERICAN RING CRUSHERS which operate 18 hours a day. Through their low cost, and because crushed turnings bring more money, each machine shows an actual profit of \$18,096.00 per year. You can share in the advantages derived from AMERICAN EQUIPMENT. Send for a staff representative. He will help you to decide on the correct AMERICAN CRUSHER for the particular requirements of your plant.

American Ring Crushers are crushing run of mine coal to stoker size at a maintenance cost as low as 1/10 of a cent a ton.



MANHATTAN RUBBER helps the flow of Steel into a thousand shapes—for Defense *

The sparks and the glow and the lurid liquids that flow from furnace and ladle are the climax of grandeur in the saga of steel.

But this molten spectacle is but one scene in the solid drama of metallurgy where rubber plays a varied role.

MANHATTAN makes hundreds of products which help shape billet and bloom to the needs of Man as well as of Mars.

Ore and coal, coke and limestone travel from mine and quarry on rubber conveyor belts; air and

steel and allied industries.

water and steam are borne through rubber hose; parts are welded, sand-blasted, pickled and plated with the aid of rubber. These and an astonishing list of other products—like abrasive wheels for snagging and cutting off, and asbestos brake lining for cranes and hoists-are part of what MANHATTAN makes for the Steel Industry under the banner of Defense.

> A few MANHATTAN Products used by the Steel Industry

of RAYBESTOS-MANHATTAN, INC. GENERAL OFFICES and FACTORIES-PASSAIC, NEW JERSEY

Rubber-Lined Pickling and Plating Tanks Rubber Covered Rolls Rubber Wheels Abrasive Wheels Brake Lining, Clutch Facings Asbestos Cable Covering

A typical Manhattan con-THE MANHATTAN RUBBER MFG. DIVISION veyor belt installation in the

Commercial" ANNULAR BALL BEARINGS

INCREASE PRODUCTION AND EFFICIENCY

"Commercial" Ball Bearings not only help to increase production, but they also bring about substantial savings in time, labor and money. Here, for example, is a specially designed "Commercial" ball bearing roller used in coal conveyors (reciprocating type). This ball bearing roller supports a moving platform running upon a metal track. Platform moves forward slowly: backward, at much greater speed. Coal remains stationary during backward movement.

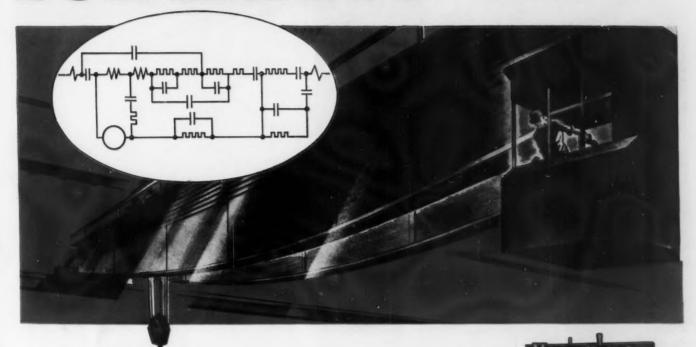
This is only one of hundreds of different types of "Commercial" ball bearings specially designed by us for some specific duty or purpose.

Our Engineering Staff Will Gladly Cooperate

Manufacturers in every industry are invited to communicate with our Engineering Staff or write for Catalog and complete details. We will be pleased to submit suggestions or design original installations for your plant machinery or product.



FOR SAFETY THE CIRCUIT COUNTS



NEW PERFECTED CRANE HOIST CONTROL WIRED TO GIVE YOU:

COMPLETE SAFETY—so you won't lose a load.

Safer Brake Circuit-because the same contactors close armature and magnetic brake circuits - magnetic brake cannot be released unless dynamic braking is effective.

HIGHEST SPEED - consistent with safety.

High-speed Light Hook Lowering-without excessive speeds when lowering heavy loads-without complication and hazards of load relays.

ACCURACY-for easier, safer operation.

Inching That's Accurate to a

Hair-enabling operator to place the hook exactly where he wants it.

ECONOMY-on power and maintenance.

More Power Returned to the Line

Lowest Brake Maintenancegreater part of deceleration is accomplished by dynamic brakingthe magnetic brake does not set until the motor reaches low speed, thus minimizing wear on lining.

Write today for Descriptive Data

9600 giving complete details.

Class 9635 Westinghouse Crane Hoist Controller

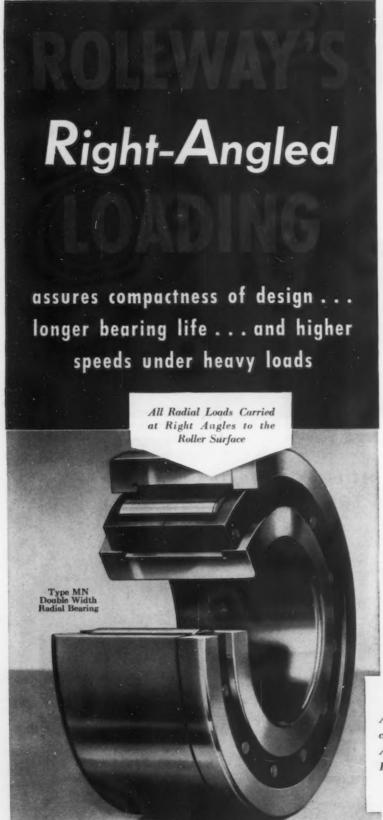
incorporating the new series 200 SM contactors and Type TI and TL Relays.

Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

J-20894

Westinghouse CONTROLLERS





THEY'VE GOT WHAT IT TAKES FOR THE 168-HOUR WEEK

By splitting the load into its simplest components of pure radial and pure thrust, Rollway provides greater carrying capacity in a given space. Compactness of machine design is made possible. Wear is decreased. The friction load on each individual roller is lightened. And need for service attention is substantially reduced.

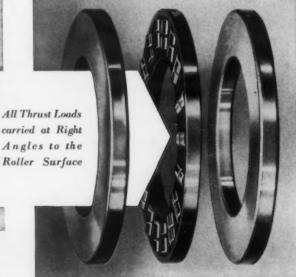
The sum of these advantages is reflected in longer bearing life, especially under conditions of high shaft speeds and heavy load . . . factors that are vitally important in today's 168-hour week and defense schedule speed-up.

For designs requiring simplified assembly to permit greater bearing area and capacity, Rollway double-width radial bearings with separable outer race not only simplify the mounting problem but greatly reduce wear even under extreme operating conditions. And they're specially constructed to absorb a relatively heavy locational thrust.

Send us your plans today for engineering analysis and bearing recommendations.

REMEMBER_You can usually change over from other kinds of bearings to Rollways of higher load capacities without increasing boundary dimensions.

Type T Single Acting Thrust Bearing



ROLLWAS

BEARING COMPANY, INC., SYRACUSE, N.Y.

BUILDING HEAVY-DUTY BEARINGS SINCE 1908

BEARINGS

A Quarter of a Century



the illustration is that of a 225 year the illustration is that of a 225 year the illustration is that of a 225 year the illustration is the illustration of the England now exhibited in Scotland and used by the England now exhibited in Reserve of New England western Reserve of New Museum of the Nuseum of the Nuseum of Cleveland, Ohio Historical Society at Cleveland, Ohio

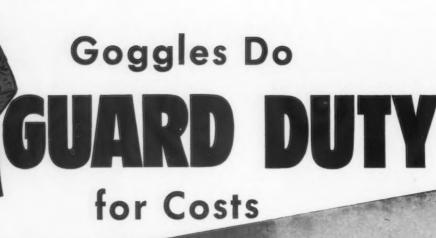
Casts its Shadow

Twenty-five years of commerce, as the sands alone record, really isn't uncommon. The pronouncement usually comes with the attainment of some degree of mastery, service or distinction accredited during that span of years. Lee Spring commemorates a silver anniversary—not alone from a time element—but because of a growth attributed largely to the single factor—QUALITY... And Lee shall cope with this factor to carry on toward a still greater longevity.

LEE SPRING
30 MAIN STREET



COMPANY, INC. BROOKLYN, N. Y.





American Goggles guard against flying chips that might destroy or injure workers' eyes, upset workschedules, boost production costs. Equipped with Super Armorplate Lenses, American Goggles provide greater resistance to impact. Designed and made by experienced optical craftsmen, they are light, cool and comfortable to wear.

Do you have a complete eye protection program in your plant? It pays to have one . . , to provide every one of your workers with the

type of American equipment designed to protect his sight—and your dollars. Ask your AO representative to show you the entire American line and the figures of what well planned eye safety programs are doing for other manufacturers.

American Optical Company

SOUTHBRIDGE, MASSACHUSETTS, U.S.A.



MANUFACTURERS, FOR MORE THAN 100 YEARS, OF PRODUCTS TO AID AND PROTECT VISION

THE BIG GUNS OF DEFENSE

SPEED PRODUCTION

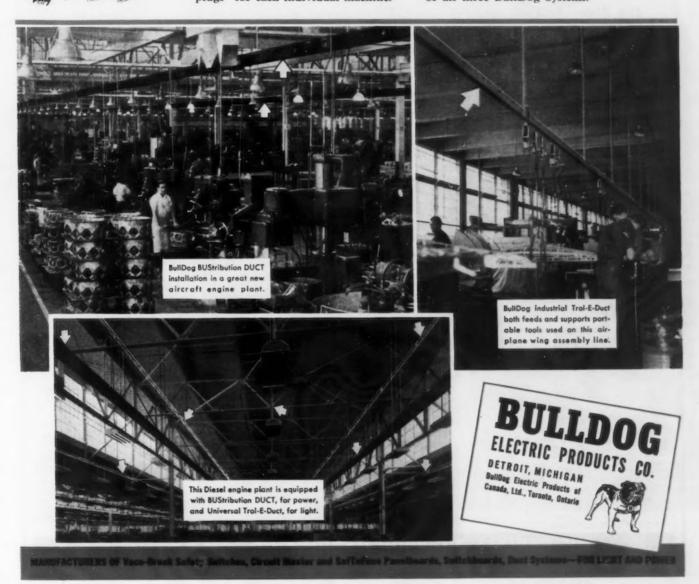
With BullDog "Plug-in" Electrical Distribution

DAY BY DAY more defense contractors — making everything from battleships to eyelets for shoes and from bombers to army shirts—are equipping their new plants, or modernizing their old, with BullDog Flexible Electrical Distribution Systems.

BullDog's "plug-in" Bus Duct systems are ideally suited to save precious production time for industry—to avoid wiring delays or delays in rearranging machinery and in planning new buildings. BullDog Bus Duct systems give ready light and power anywhere, permit "plug-ins" as simply as appliances in the home, and include various protective "plugs" for each individual machine.

There are three BullDog Systems—BullDog BUStribution Duct for Power; Universal Trol-E-Duct for Light, and Industrial Trol-E-Duct for Production Lines or Assembly Benches. They are used singly or in combination; are built in standardized, interchangeable sections; are quick and easy to install or to move from one position or one plant to another, and are completely salvable.

Write for Bulletins 403 and 412 describing these modern wiring systems. Better yet, ask for a call from a Bull-Dog sales engineer—and ask him to show you the roster of hundreds of defense plants equipped with one, two or all three BullDog Systems.

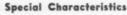


THE JOHNSON FRICTION CLUTCH

"MAXITORQ" TYPE

THE NEW "MAXITORQ" MULTI-DISC FLOATING PLATE CLUTCH*

Particularly Adapted to Machine Tool Installations and for Use in All Industrial Machinery



Floating Plates—Minimum of drag, abrasion or heating in neutral.

Manual Assembly—Assembled or taken apart, without use of tools.

Adjustment—Manually, by turning knurled ring clockwise after raising locking spring.

Engagement—Easily controlled with light pressure.



Double

WET or DRY PLATE:

Wet Plate—All plates of hardened steel, to be run in lubricant.

Dry Plate—Alternate plates of steel and selflubricating bronze.

"Maxitorq" FP Multiple Disc Clutches are supplied in single or double type. The double is a compact, integral unit, and is not a combination of two single clutches. Non-metallic shoes with studs are supplied with each clutch. These, riveted into the engaging lever, prevent wear in shipper sleeve groove.

In neutral, no disc touches the ones adjacent to it (FP, Floating Plates). A separator spring* between each pair of inner discs, spreads these endways with an accordion action, so that light can be seen between all discs.

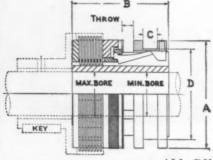
A locking plate* on the disc end of each clutch (two on double type) locks all discs against this

spring tension. Counter-clockwise movement of three or four turns of knurled adjusting ring removes this spring tension, locking plate can be pressed endways slightly against the discs, when one-third of a turn of the locking plates releases it, and this plate and all discs can be removed, and the balance of the clutch taken apart.

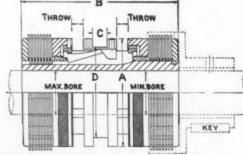
The separator springs assure quick disengaging and prevent excessive drag, abrasion or heat so common in many clutches of the multiple disc type. No oil release holes or radial oil grooves required in the plates of the FP type "Maxitorq."

These patented improvements in clutches covered by the registered trade name "Maxitorq" are new to multiple disc clutch construction, developed after 40 years of experience in manufacturing the well known‡ "Johnson" Expanding Ring Friction Clutch. They are the result of years of research, breakdown tests, and actual use for several years on machine tools and other industrial machinery.

* Patented: U. S. and Foreign Countries



Note: Cupped Hub (dotted member), should be hardened steel, with hub fitted with bronze or antifriction bearing. Not standard equipment, but can be supplied at extra price to meet customers' requirements.



ALL DIMENSIONS NOTED BELOW ARE IN INCHES

Clutch No.	Disc dia.	H. P. at 100 r.p.m.	Max. working torque ft. lbs.	Full active discs	Body bore			Axial	Driving lugs			A	В		С	D
					Min.	Max.	Keyway	pres- sure, lbs.	No.	Width	Throw to Engage	Single Double		Single Double	Single Double	
*22 23 24 25 *26	2 ½ 3 ¼ 3 ¾ 4 ½ 5 ½	1 1 3/4 3 5	27 53 92 158 263	11 13 13 13 13	1 1 1/4 1 1/2 1 3/4 2	1 1/8 1 3/8 1 5/8 1 7/8 2 1/4	36 X 32 14 X 1/8 56 X 52 88 X 36 76 X 37	30 30 40 60 80	3 3 3 8 12	.740 .990 .990 .740 .615	7 10 7 27 7 28 0 10 10 10 10 10 10 10 10 10 10 10 10 1	3 16 3 16 4 1/4 4 16 5 1/2	3 ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½	5 17 6 15 6 15 6 15 7 7 22 2 8 3 8	1/2 5/8 5/8 3/4 3/4	2 5/8 3 1/4 3 1/6 4 1/6 4 5/6

* In development stage.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

Now . . . A Big-Capacity Athey MobiLoader to Match BIG SHOVEL PRODUCTION



DIGS AT THE FRONT

Substantial Savings in Initial Investment and Operating Costs

To extend the speed and economy of the MobiLoader to a wider range of uses, Athey offers the Model 8 MobiLoader . . . a companion to the job-proved Model W4.

Now, with greatly increased capacities and using the heavy-duty "Caterpillar" D8 Tractor for power, the MobiLoader enters a new field makes available a mobile, cost-cutting loading tool that provides big output in less time at low cost.

The Athey MobiLoader uses the simple and time-saving method of digging at the front and dumping its load overhead at the rear, thus eliminating turning the tractor around for discharging the load. In that way, the

MobiLoader does the job faster and cheaper, reduces operating expense and tractor wear, enables you to step up your production to more profitable levels.

Proved on actual operations for more than two years, the Model 8 Mobi-Loader has introduced shortcuts in the handling of ore, coal, earth, clay, gravel, crushed stone and all stockpiled materials - has displaced costly and antiquated methods and equipment.

Now's the time to assure utmost efficiency on your defense jobs. Get more facts on this big-capacity, mobile loader. Mail the coupon today for an interesting folder - sent without obligation.

Bucket sizes for Model 8 MobiLoader range from 2.7 to 4½ cubic yards, depending upon type of material. Model W4 MobiLoader capacity is 11/4 cubic yards for general excavation and 3 cubic yards for snow removal.

Above photos show borrow pit excavation for material to build roads to Michigan bomber plant. **DUMPS AT** THE REAR

> MobiLoader on Mesabi Iron Range saves time and money loading iron ore concentrate into railway cars

The Athey line includes Earth and Rock Trailers, Oil Field Trailers and Wagons, Logging Cruiser Wheels, MobiLoaders, Force-Feed Loaders and Trailer equipment for every knowing week

ATHEY Y

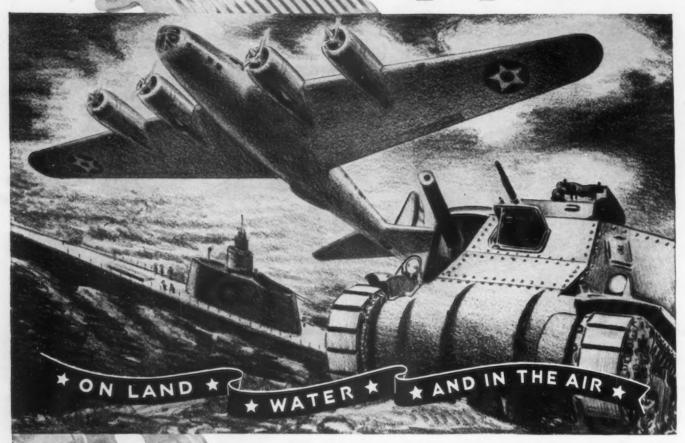


Athey Truss Wheel Co. 5631 W. 65th Street Chicago, Illinois

Please send me, at no obligation, descriptive folder on the Model 8 MobiLoader. I am interested in loading.

Address

Morse puts Teeth into Defense Equipment *



N DEFENSE EQUIPMENT—where the ultimate in power transmission is necessary—you'll find Morse Chain Drives on the job. In defense factories, too, Morse Drives are at work, transmitting all the power from drivers to working machinery efficiently and dependably. "Teeth, Not Tension"—no slippage—no power waste. They have the stamina to roll through overloads, shocks, moisture, dust and fumes without a falter. Investigate what Morse Chains can do for you—consult the Morse man in your territory.

SILENT CHAINS

ROLLER CHAINS

FLEXIBLE COUPLINGS

CLUTCHES

MORSE positive DRIVES

MORSE

CHAIN

COMPANY

ITHACA N. Y.

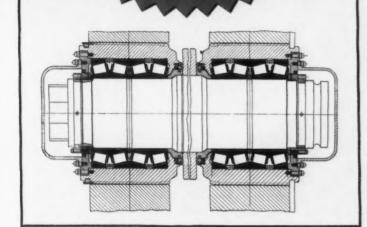
DIVISION

BORG-WARNER

CORP.

LOOK AHEAD!

When defense production stops — sharp competition for steel orders. Keep manufacturing costs down with faster, more economical rolling mills completely Timken Bearing Equipped.



Timken Back-up Roll Neck Bearing as applied to a high-speed strip mill. Bearing is mounted tightly on roll neck, but ease of removal when making roll changes is provided for. Bearing and chock form a sealed assembly, guarding the bearings against the entrance of mill scale, grit or water.

Rolling mills equipped with Timken Roll Neck Bearings are doing a splendid job for defense, rolling ferrous and nonferrous metals. The huge bearing shown below is one of a number of Timken Back-up Roil Bearings supplied to the Aluminum Company of America for its new 2,400-foot long rolling mill at Alcoa, Tennessee. These bearings measure 35½" bore x 51" outside diameter x 36" width, weigh 9,070 lbs. and have a mill separating force of 8,300,000 lbs. at mill speed.

The more Timken Bearings there are in rolling mills—on back-up rolls, work rolls and auxiliary equipment—the faster they operate; the more accurate they are; and the less they cost for operation and maintenance. These are the kind of mills that will meet the needs of the future.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

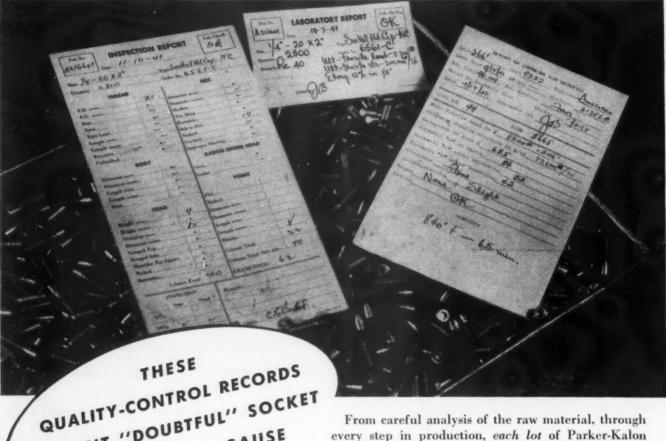


Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.



Matchmen

that Protect Your Defense Assemblies!



PREVENT "DOUBTFUL" SOCKET SCREWS THAT CAUSE DELAYS AND REJECTS

PARKER-KALON Quality-Controlled **SOCKET SCREWS** Give the Green Light to Defense Assemblies

From careful analysis of the raw material, through every step in production, each lot of Parker-Kalon Socket Screws is guarded by these "watchmen" . . . the quality-control records you see here. One reports on the Parker-Kalon Laboratory's analysis of the special alloy steel . . . another is the Lab's point-by-point okay of all physical characteristics of the finished screws. A third record covers an extensive series of critical inspections of dimensions and other details.

The uniformly high standard of quality which MUST RESULT from such rigid control is ample reason why industry specifies PARKER-KALON for important defense assemblies. Besides, it costs no more to have this protection against "doubtful screws" . . . screws that look all right but some of which fail to work right. Parker-Kalon Corp., 200-202 Varick Street, New York.



Quality - Controlled

16-point test and inspection routine covers:
Chemical Analysis; Tensile and Torsional
Strength; Ductility; Shock Resistance under
Tension and Shear; Hardness; Head diameter,
height and concentricity; Socket shape, size,
depth and centricality; Class 3 Fit Threads;
Clean-starting Threads.



One RESPONSIBILITY... One CONTROL

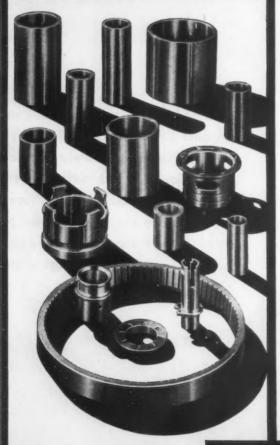
FROM raw materials to finished product . . . your specifications are carefully and accurately worked to completion . . . one definite control and one responsibility . . . these advantages are yours when you place your requirements for special forgings and steel castings with the Erie Forge Company.



ERIE FORGE COMPANY, ERIE, PA-







AIRCRAFT, tanks, ordnance equipment required by the armed forces of America; machine tools, electric motors, power transmissions, conveyors; every kind and type of mechanism built and used in the busy factories of the Nation—all these today depend on Bunting Bearings more than ever before.

For the service and convenience of many who cannot readily obtain Bronze Bearings in specially executed alloys and designs, we offer prompt delivery from stock of hundreds of different sizes of completely finished Bunting Bronze Bearings suitable for practically all mechanical applications, and for electric motors of all sizes and makes. Plus a

free engineering service which aids the user in adapting these stock bearings to unusual requirements. Also Tubular and Solid Bars of Bunting Bearing Bronze, completely machined on all surfaces to save the user labor and waste of metal. Ask your wholesaler. Write for catalog.



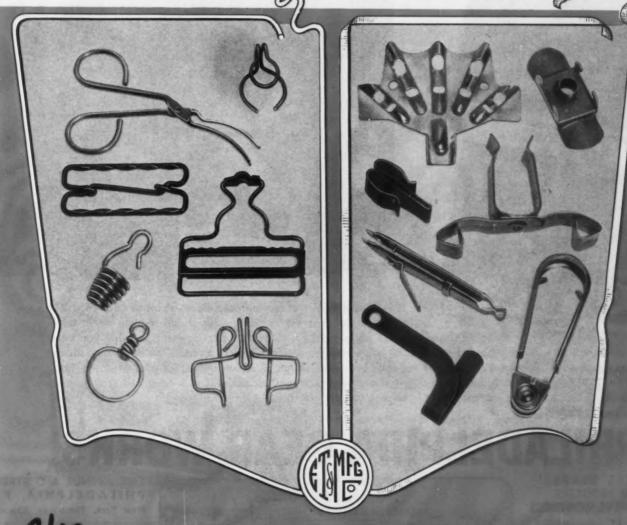
The Bunting Brass & Bronze Company, Toledo, Ohio.... Warehouses in All Principal Cities.

Typical Bunting Bronze Bearings for aircraft engines, tank transmissions, gun carriages, and general mechanical applications. BUNZE BUSHINGS
PRECISION BRONZE BARS

BEARINGS
BABBILT METALS

AUTOMATIC

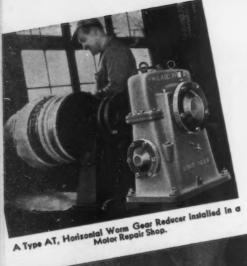
Wire Frankry Motal Stamping



ALSO PLATING WELDING ASSEMBLING

• If your work can be produced on automatic machines, we are in a position to handle it at a substantial saving for you. • Our automatic machinery is designed particularly for low cost, high production work, enabling us to offer attractive prices on high quality work. • We now manufacture over 7,000 catalog items. • Invite us to quote on your wire forming and metal stamping requirements. You will be interested in our estimate.

EASTERN TOOL & MFG. COMPANY BLOOMFIELD, NEW JERSEY



"ONLY A COMPLETE LINE OF SPEED REDUCERS CAN MEET ALL DRIVE **REQUIREMENTS...SO** WE MAKE ALL TYPES"





The many different operating conditions encountered in industry make it essential that the right type of speed reducer be chosen, if economical and efficient performance is to result. But . . . the right type can only be provided when there is a complete line available. Because of this Philadelphia

has for years made all types of speed reducers in a wide range of ratios and horsepowers. Also, there is the Philadelphia MotoReduceR in horizontal and vertical types for use where a complete drive unit is desired. Our engineers are specialists in helping you choose the best drive for your needs. Call on them ... write today.

HILADELPHIA GEAR WORKS

INDUSTRIAL GEARS AND SPEED REDUCERS LIMITORQUE VALVE CONTROLS





SPEED REDUCER







MOTOREDUCER omical self-contained drive, or Vertical types — various



Philadelphia GEARS



ERIE AVENUE & G STREET PHILADELPHIA, PA.

New York, Pittsburgh, Chicago

ALLOWELL FEATURES

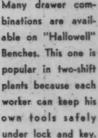


THE TOPS ARE "TOPS"! "Hallowell" Bench tops are famous for their ability to withstand time and abuse. The model shown is fitted with a heavy laminated maple wood top. Steel and Masonite tops are also available.



STRONG . . . AND HOW! Typical of "Hallowell" refinements is the heavy, hot-rolled T-iron bar construction that helps to insure lifetimes of usefulness regardless of

FOR SAFEKEEPING:





plants because each worker can keep his under lock and key.

YOU BET THEY'RE RIGID!

Flanged and ribbed steel leg construction insures absolute steadiness without bolting to the floor . a famous and convenient "Hallo-

well" feature.

THESE **FEATURES** belong in your shop!

The choice of particular buyers, "Hallowell" Steel Benches boast exclusive advantages that lift them above the ordinary steel equipment class and explain their popularity throughout industry . . . the line comprises a range of more than 1300 styles and models to fit practically every need . . . each one noted for its sturdiness, rigidity, wearing quality and smart appearance.





TAKE YOUR PICK! Unique is the wide range of leg sizes "Hallowell" provides for varying requirements. Available in "Standard" and "Extra Heavy" construction.

HALLOWELL FEATURES

COMPLETE DETAILS AND PRICES? . . . just fill in and send today the coupon on the next page. Our catalog will be sent promptly and without obligation.



· HALLOWELL SHOP FURNITL

DE LUXE EQUIPMENT
The last word in refinements, looks and usefulness,
"Hallowell" DeLuxe Shop
Furniture of Steel includes,
benches, foreman's desks
and tool cabinets in a wide
range of styles and models.
You'll want details about
the outstanding advantages of this DeLuxe line
. . . fill in and send now
the coupon below.



Fig. 1734

HALLOWELL HAS IT!

A Complete Line of SHOP FURNITURE OF STEEL TO MEET YOUR REQUIREMENTS!

Recognized for many years as the standard in shop equipment, the famous "Hallowell" Lifetime Line comprises a range of types, styles and models to meet practically every need. You'll appreciate the sturdiness, styling and wearing quality of each member in the line...check off and mail today the coupon below. Full information sent promptly . . . no obligation.

TOOL STANDS

Rugged all-steel construction and easy rolling swivel casters make these handy tool stands a lasting aid to efficiency in any shop. You can count on the "Hallowell" to save steps, time and money. Many styles and models. Mail the coupon.



STOOLS AND CHAIRS

There's a "Hallowell" Stool or Chair to provide lifetimes of work-producing comfort economically in your shop or office. Welded steel construction and streamlined posture design are built into each of the many types and models. Catalog and details? Send the coupon.



TRUCKS

"Hallowell" Steel Trucks roll easily under all loads . . . their welded construction defies time and abuse. Joints won't loosen and wobble! There's a type and model for your use—at order-inviting prices. Use the coupon.



STANDARD PRESSED STEEL CO.

Box B-12

Jenkintown, Penna.

Please send me, without obligation, bulletins and details covering the following "Hallowell" Shop Equipment:

	ma.							
Benches	DeLuxe	Equipment	1001	Stands	Trucks	Stools	and	Chain

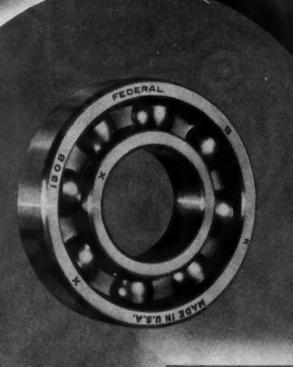
NAME_____TITLE

COMPANY_____

ADDRESS

CITY_____STATE__





FFDFRAL BEARINGS

THE FEDERAL BEARINGS CO., INC.

Makers of Fine Ball Bearings

Chicago Office: 902 S. Wabash Ave





FOR DEFENSE

On the biggest jobs in Industry today, Schrical Roller Bearings are providing BUILT-IN ALIGNMENT to compensate for shaft deflections, distortions and weave. HIGH CAPACITY and LOW FRICTION keep the wheels of Defense machinery turning at top speed.

EDESE INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.



Scrap-Iron Grapples...

"All Out" Production requires that all available scrap iron in its various forms be moved by the speediest method.

Owen "Proved" New Method Scrap Handling Systems featuring the revolutionary grapple are outperforming all known competitive methods.

Investigate fully TO-

(Below) New Improved four line rehandling bucket suitable for any rehandling handling materials

> Whether it's a problem of handling or rehandling ore, coal or other miscellaneous materials, there is an Owen Bucket of advanced design available, to fit into your scheme of operations.

Check the efficiency of your present equipment with the very low operating costs of Owen Buckets.

THE OWEN BUCKET CO.

6011 Breakwater Avenue - CLEVELAND, OHIO

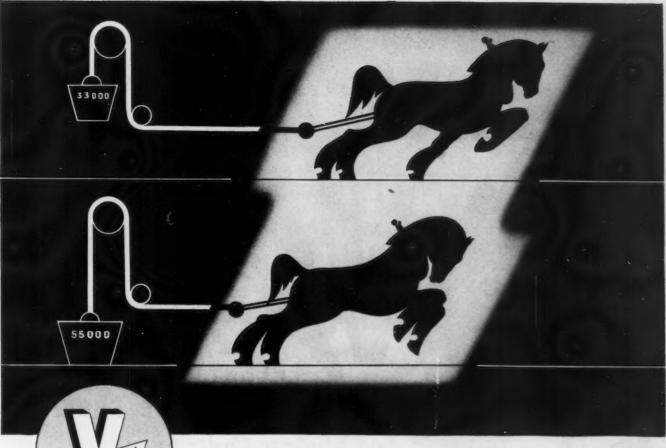
BRANCHES

NEW YORK PHILADELPHIA CHICAGO BERKELEY, CAL.





488-THE IRON AGE, January 1, 1942



how the "service factor" eliminates underguessing the required h.p.

During the early period of Multiple V-Belt Drive development it became apparent that somewhere in the selection formula, some important factor was missing. The belts on some installations wore out prematurely, although the drive theoretically satisfied all the mathematical requirements. In other cases where the specifications seemed identical, the drive delivered unusually long service. . . . Endless field surveys and the comparison of findings by members of the Multiple V-Belt Drive Association brought the "vagrant variable" to light. The difference lay in the characteristics of the prime mover and the nature of the load. It was discovered that some types of drives required up to double the number of belts for the same drive horsepower. . . . Results of thousands of check-ups, tabulated to include every conceivable combination, became today's "Service Factors". These "Service Factors" eliminate underguessing the required h.p. of the belts and assure long and uninterrupted service life.

THE DOMINANT DRIVE OF INDUSTRY

TRADE MARK

The use of this emblem by an association member in connection with Multiple V-Belt Drives is your assurance of mechanical excellence — the result of cooperative engineering, research and experience.

MULTIPLE - V - BELT DRIVE ASSOCIATION 140 SOUTH DEARBORN STREET .





YEARS EUCLID CRAN We Installed 3 New



The EUCLID 3 Reduction TROLLEY

Precision machined and hards gears revolve in oil-tight housi split at centers to permit easy rem of the short, rugged shafts. The re-bearings are fitted into caref machined capsules.

EUCLID Electric HOISTS

ctical trolleys and control
s from 1/4 ton to 20 tons cap

Write for Bulletin No. 838.



F GOOSE NECK LOW BED HEAVY DUTY TRAILERS ON PNEUMATIC TIRES



OGERS BROTHERS CORPORATION ALBION, PENNSYLVANIA

December 9, 1941

The Euclid Crane & Hoist Co., Euclid, Ohio

Gentlemen:

The service of one of your cranes in our plant was so outstanding as to be worthy of special acknowledgment. This crane, the third built by you, was installed in May, 1910.

For 30 years thereafter, until retired a few months ago, this crane was subjected to consistent heavy service and was frequently very heavily overloaded.

impressed by this service, we ordered a Euclid Crane when again in the market. Since the we have installed two identical Euclid Cranes. Since then

It is our sincere opinion that the Euclid Crane is unexcelled for quality and service and we feel it is only right to acknowledge the remarkable results we have enjoyed.

Very truly yours,



ROGERS BROTHERS CORPORATION 1900

aus 1 Louis Rogers, President

EXPERIENCE builds'em PERFORMANCE sells'em

Yes, quality is built into even the smallest parts of Euclid Cranes to assure many years of efficient and economical service.

Almost without exception Euclid Cranes outlast reasonable and normal life expectancies — resulting frequently in repeat orders.

THE EUCLID CRANE & HOIST CO.

A suburb of Cleveland EUCLID, OHIO

SPECIALS * * TO SPECIFICATIONS

• In addition to regular cap and set screws we manufacture special headed and threaded items. The Kaufman Process makes possible fast, economic production of many parts impossible heretofore to upset.

THE CLEVELAND CAP SCREW CO., 2917 EAST 79th STREET, CLEVELAND, OHIO

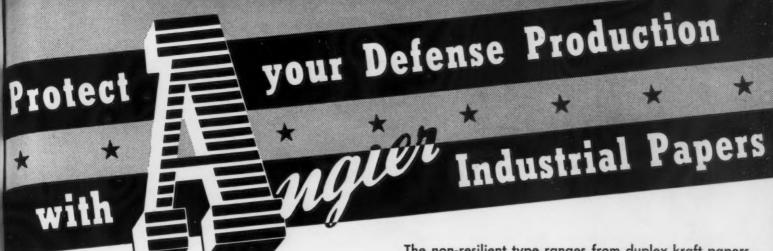


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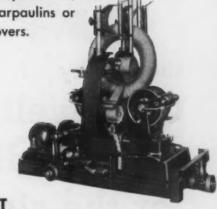
The non-resilient type ranges from duplex kraft papers bonded together with asphalt to heavy waterproof papers reinforced with woven burlap.

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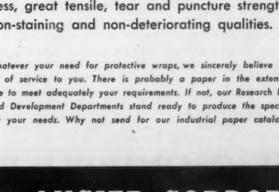
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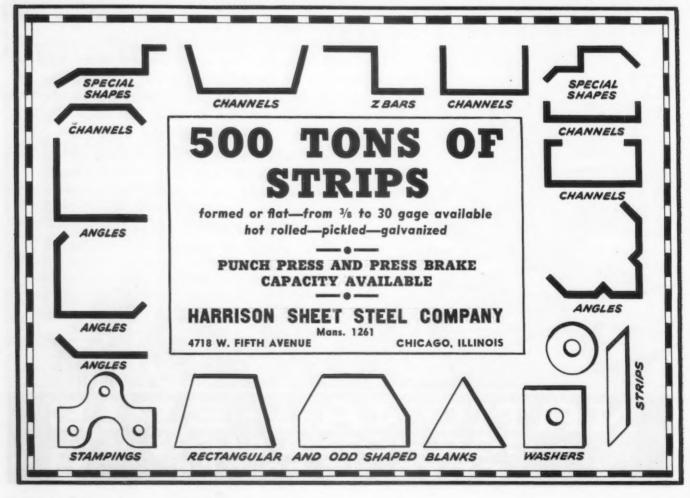
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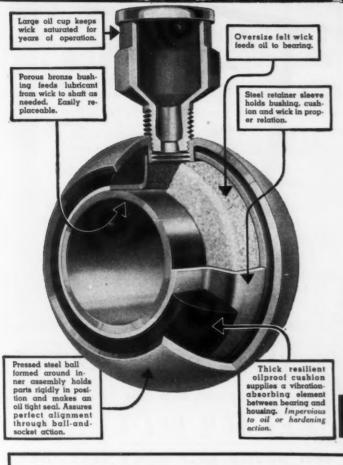
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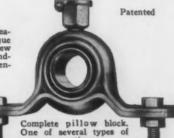
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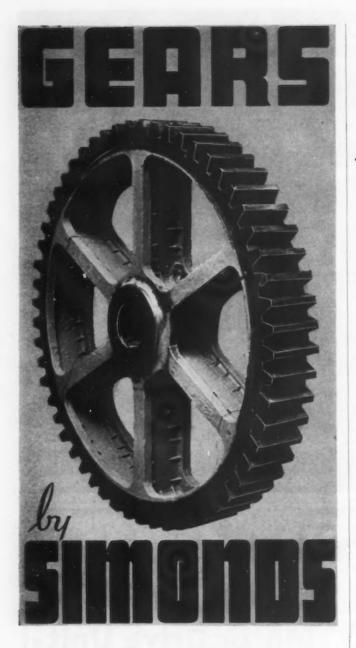
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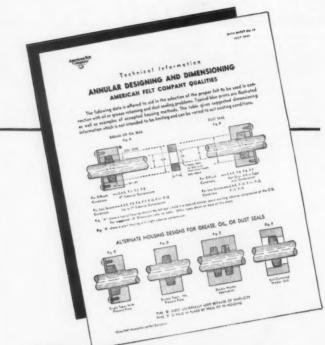


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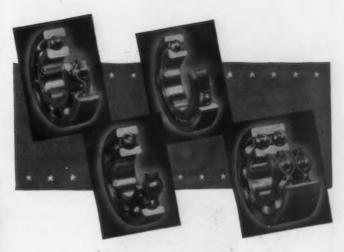
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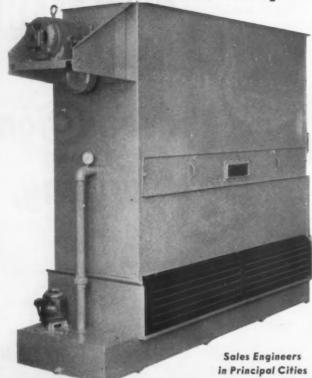
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Hydraulic Press Mfg. Co., The, Mt. Gliead, Ohio.
Morgan Engineering Co., The, Alliance, Ohio.

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Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.
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Co. Print Add. Sharmor Plate Straightening Standard Steel Spring Co., Coraopolis, Pa.

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Air Reduction, 60 East 42nd St.,
N. Y. C.
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Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

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Alloys—Bismuth
Cerro De Pasco Copper Corp., 44 Wall
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Ampco Metal, Inc., Milwaukee, Wis.
Mallory, P. R., & Co., Inc., Indianapolis, Ind.
Revere Copper & Brass, Inc., 230 Park
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Coast Metals, Inc., Canton, Ohio,
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Belts—V-Type
Allis-Chalmers Mfg. Co., Milwaukee.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Towsend St., Passalc, N. J.
Manheim (Pa.) Mfg. & Belting Co.
Muitiple V-Belt Drive Assn., Chicago,
Ill.

Bench Legs—Steel

New Britain-Gridley Machine Div., The

New Britain Machine Co., New New Britain Machine Co., New Britain, Conn. Standard Pressed Steel Co., Jenkin-town, Pa.

Benches—Steel Work
Standard Pressed Steel Co., Jenkintown, Pa.

Bending Machines—Hand, Band and Angle

Angle
Excelsior Tool & Mch. Co., E. St.
Louis, Ill.
Hossfeld Mfg. Co., Winona, Minn. Bending Machines
Buffalo (N. Y.) Forge Co., 492 Broad-

Burnaio (N. Y.) Forge Co., 492 Broad-way. Cincinnati (Ohio) Shaper Co., The Cleveland Crane & Engineering Co., The, Steelweld Mchry, Div., 1115 East 283rd St., Wickliffe, Ohio. Cleveland (Ohio) Punch & Shear Works Cleveland (Ohio) Punci et baseline Co., The. Dreis & Krump Mg. Co., Chicago, III. Hossfeld Mfg. Co., Winons, Minn. Kane & Roach, Inc., Syracuse, N. Y. Niagara Machine & Tool Works, Buffalo, N. Y. Yoder Co., The, Cleveland, Ohio.

Benzol Recovery Plants
Koppers Co., Engineering & Construction Div., Pittsburgh.

Beryllium Copper
American Brass Co., The, Waterbury
Conn.,
Ampro Metal, Inc., Milwaukee, Wis.

Ampoo Metal, Inc., Milwaukee, Wis.

Billets—Alloy & Corbon Steel
Alan Wood Steel Co., Conshohocken, Pa
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Copperweld Steel Co., Warren, Ohio.
Harrisburg (Pa.) Steel Corp.,
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh,
Midvale Co., The, Nicetown, Phila,
Pa.

ingham, Ala.

Billets—Forqing
Alan Wood Steel Co., Conshohocken,
Pa., Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.,
Pittsburgh (Pa.) Steel Co.,
Republic Steel Corp., Cleveland, Ohio

Billets—Re-rolling Facilities
Nicetown Plate Washer Co., Inc.
Philadelphia, Pa.

Blacking Saits, for Steel
Alrose Chemical Co., Cranston, Providence, R. I.
Heatbath Corp., Springfield, Mass.
Mitchell-Bradford Chemical Co., The,
Bridgeport, Conn.

Bridgeport, Conn.
Blast Cleaning Equipment
American Foundry Equipment Co., The,
510 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., The, Chicago, III.
Pangborn Corporation, Hagerstown, Md.
Ruemelin Mfg. Co., 3870 N. Palmer
St., Milwaukee, Wis.

St., Milwaukee, Wis.

Blast Furnace Plants—Complete
Brassert, H. A., & Co., Plttsburgh, Pa.
McKee, Arthur G., & Co., Cleveland.
Pennsylvania Engineering Works, New
Castle, Pa.

Castle, Fa.

Blost Furnace Specialties
Bailey, Wm. M., Co., Pittsburgh, Pa.
Broslus, Edgar E., Inc., Sharpsburg
P. O., Pittsburgh, Pa.
McKee, Arthur G., & Co., Cleveland,
Pennsylvania Engineering Works, New
Castle, Pa.

Blast Gates
Rockwell, W. S., Co., 50 Church St.,
N. Y. C.

N. Y. U.

locks—Chain

Ford Chain Block Div. American

Chain & Cable Co., Inc., Philadelphia, Pa.

Yale & Towne Mfg. Co., The, Phila.

Div., Phila., Pa.

Blocks—Set-Up, for Machine Tools Standard Shop Equipment Co., Inc Philadelphia, Pa.

wers
Allis-Chalmers Mfg. Co., Milwaukee,
Wis. Wis.
American Blower Corp., 6000 Russell
St., Detroit, Mich.
North American Mfg. Co., The Cleve-land, Ohio.
Roots-Connersville Blower Corp., Con-nersville, Ind.
Sciencer Turbine Co., Hartford, Conn.

Blowpipes—Soldering, Heating American Gas Furnace Co., Elizabeth, New Jersey. Weldit Acetylene Co., Detroit, Mich.

Blue Printing Machines & Paper Pease, C. F., Company, The, 2695 W. Irving Pk. Boad, Chicago, Ill.

Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

Bolt and Nut Machinery rt and Nut Machinery
Ajax Mfg. Co., The, Cleveland, Ohio.
Landis Machine Co., Waynesboro, Pa,
Oster Mfg. Co., The, Cleveland, Ohio.
Waterbury (Ct.) Farrel Fdry. & Mch.
Co., The.

Bolt & Rivet Clippers Helwig Mfg. Co., St. Paul, Minn.

Bolts—Machine Tool Table Standard Shop Equipment Co., Inc., Philadelphia, Pa.

Bolts—Special
Bethlehem (Pa.) Steel Co.
Cleveland (Ohio) Cap Screw Co., The.
Lamson & Sessions Co., The, Cleveland,
Oliver Iron & Steel Corp., Pittsburgh, Pa. cpublic Steel Corp., Cleveland, cussell, Burdsall & Ward Bolt & Co., Port Chester, N. Y.

Bolts—Stove Cleveland (Onio Cap Screw Co., The. Lamson & Sessions Co., The, Cleveland, Oliver Iron & Steel Corp., Pittsburgh, Pa.
Pa.
Progressive Mfg. Co., Torrington, Conn.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut
Co., Port Chester, N. Y.

Bolts-Stove, Recessed Head American Screw Co., Providence, B. I.

Bolts-T Slots tandard Shop Equipment Co., Inc., Philadelphia, Pa.

Bolts-Track of the steel Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp., Subsidiary), Pittaburgh & Chicago.

Lamson & Sessions Co., The, Cleveland, Ohio.

Oliver Iron & Steel Corp., Pittaburgh, Dec. Pa.
Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Birmingham, Ala.

American Screw Co., Providence, B. I. Bethlehem (Pa.) Steel Company. Clark Bros. Bolt Co., Mildiale, Conn. Cleveland (Ohio) Cap Screw Co., The. Harper, H. M., Co., The, 2607 Fletcher St., Chicago, Ill. Lamson & Seesions Co., The Cleveland. Oliver Iron & Steel Corp., Pittsburgh, Pa.

Republic Steel Corp., Cleveland, Ohio, Bhode Island Tool Co., Providence, Riode Island Tool Co., Providence, R. I. Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. Triplex Screw Co., Cleveland.

Boring Bars
Bullard Co., The, Bridgeport, Conn.
Carboloy Co., Inc., 11153 East 8-Mils
Road, Detroit, Michigan.
Gairing Tool Co., The, Detroit,
Gisholt Machine Co., Madison, Wiscon-

Boring, Drilling & Milling Machines— Horizontal
Giddings & Lewis Machine Tool Co.,
Fond Du Lac, Wis.
Hill-Clarke Mchry. Co., 647 W. Washington Bird., Chicago.
Lucas Machine Tool Co., Cleveland.
Sellers, William, & Co., Inc., 1620
Hamilton St., Philadelphia, Pa.

Boring & Drilling Machines—Vertical Baker Bros., Inc., Toledo, Ohio. Bullard Co., The. Bridgeport, Conn. Consolidated Machine Tool Corp., Rochester, New York. National Automatic Tool Co., Richmond, Ind.

Boring Machines—Diamond & Carbide Tools

Ex-Cell-O Corp., 1210 Oakman Blvd.,
Detroit, Mich.

Heald Machine Co., The, Worcester, Heald Machine Co., Mass.
Sheffield Corp., The, Gage Div., Day-

Boring Machines-Jiq Cincinnati (Ohio) Bickford Tool Co., The Fosdick Machine Tool Co., The, Cincinratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn. Boring & Turning Mills—Vertical

ring & Iurning Mills—vertical Bullard Co., The, Bridgeport, Conn. Cincinnati (Ohio) Planer Co. Sellers, William, & Co., Inc., 1620 Hamilton St., Philadelphia, Pa. Boxes—Shop

All-Steel-Equip Co., Inc., 702 John
St. Aurora, Ill.
American Metal Works, Inc., 1516
Germantown Ave., Phila., Pa.
Stackbin Corp., Providence, R. I.
Truscon Steel Co., Pressed Steel Div.,
Cleveland, Ohio.

Boxes—Stacking
All-Steel-Equip Co., Inc., 702 John
St., Aurora, Ill.
American Metal Works, Inc., 1516 Germantown Ave., Phila., Pa.,
Stackbin Corp., Providence, R. I.
Truscon Steel Co., Pressed Steel Div.,
Cleveland, Ohio.
Union Metal Mfg. Co., The, Canton.
Ohio.

Brake Lining & Blocks—Asbestos
Johns-Manville Corp., 22 E. 40th St.,
N. Y. C.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc.,
The, 2
Towsend St., Passate, N. J. Brakes-Electric

Clark Controller Co., The Cleveland.
Cutler-Hammer, Inc., Milwaukee,
Electric Controller & Mfg. Co., The,
Cleveland.

Brakes—Magnetic Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

Brakes-Metal Forming
Birdsboro (Pa.) Steel Foundry & Ma chine Co.
ryant Machinery & Engineering Co.
Chicago. Chicago.
Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co.,
The. Steelweld Mchry. Div., 1115
East 283rd Sb., Wickliffe, Ohio.
Dreis & Krump Mfg. Co., Chicago.
Ferracute Machine Co., Bridgeton, New Jersey.
Schatz Mfg. Co., The, Poughkeepsie,
N. Y.

Brick—Insulating
Babcock & Wilcox Co., The, 85 Liberty
St. N. Y. C.
Carborundum Co., The, Perth Amboy,
N. J.

Broaches oaches
Colonial Broach Co., Detroit.
Ex-Cell-O Corp., 1210 Oakman Bivd.,
Detroit, Mich.
National Broach & Machine Co., Detroit, Mich.

Broaching Machines
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Colonial Broach Co., Detroit.
Lucas Machine Tool Co., Cleveland.
Oilgear Co., The, 1311 W. Bruce St.,
Milwaukee.

Bronze—Phosphor American Brass Co., The, Waterbury, Conn.
Bunting Brass & Bronze Co., The,
Toledo, Ohio. Toledo, Ohio.
Revere Copper & Brass, Inc., 230 Park
Ave., New York City.
Seymour (Conn.) Mfg. Co., The.

Brushes—Industrial ushes—Industrial
National Carbon Co., Inc., Carbon Sales
Div., Cleveland, Ohio.
Osborn Manufacturing Co., The, Cleveland, Ohio.
Pittsburgh Plate Glass Co., Brush Div.
Ballimore, Md.

Blaw-Knox Div. of Blaw-Knox Co., ckets—Clamshell, Grab, Dragline
Blaw-Knox Div. of Blaw-Knox Co.,
Blawnox, Pa.
Brosius, Edgar E., Inc., Sharpsburg
P. O. Pittsburgh, Pa.
Cullen-Friestedt Co., 1303 S. Kilbourn
Ave., Chicago.
Hayward Co., The, 50 Church St.,
N. Y. C.
Heyl & Patterson, Inc., Pittsburgh.
Industrial Brownholst Corp., Bay City,
Mich. Mich.
Owen Bucket Co., The, Cleveland, Okio.
Weilman Engineering Co., The, Cleveland,

Buffers-Portable
Rotor Tool Co., The. Cleveland, Ohio.

Buildings & Bridges—Steel
American Bridge Co. (U. S. Steel Corp.,
Subsidiary), Pittsburgh.
American Rolling Mill Co., The, Middletown, Ohio.
Austin Co., The, Cleveland, Ohio.
Belmont Iron Works, Philadelphia.
Blaw-Knox Div. of Blaw-Knox Co.,
Blawnox, Pa.
Iron & Steel Products, Inc., Chicago.

Buildozers

Ajax Mfg. Co., The, Cleveland, Ohio.
Cleveland Crane & Engineering Co.,
The Steelweld Mchry, Div., 1115 East
283rd St., Wickliffe, Ohio.

Burners—Oil or Gas American Gas Furnace Co., Elizabeth, American Gas Furnace Co., Elizabeth,
New Jersey.
Babcock & Wilcox Co., The, 85 Liberty
St., New York City.
Despatch Oven Co., Minneapolis, Minn.
North American Mrg. Co., The, Cleveland, Ohio.
R-S Products Corp., Philadelphia. Pa.
Stewarb Furnace Div. Chicago Flexible
Shaft Co., Chicago, Ill.
Surface Combustion Corp., 2375 Dorr
St., Toledo, Ohio.
Wean Engineering Co., Inc., The,
Warren, Ohio.

Burnishing Machines—Gear Fellows Gear Shaper Co., Springfield, Vt. Sheffield Corp., The, Gage Div., Day-ton, Ohio,

Burring Machines
National Broach & Machine Co., Detroit, Mich.
Shemield Corp., The, Gage Div., Dayton, Ohio.

Bushings—Bronze
Ampeo Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., The,
Toledo, O.
Johnson Bronze Co., 505 So. Mill St.,
New Castle, Pa.
Shenango-Penn Mold Co., Dover, Ohio.

Bushings—Drill Jig
Bushings—Drill Jig
Corp., 1210 Oakman Blvd., Bushings—Oilless Bhoades, R. W.

hoades, R. W., Metaline Co., Inc., Long Island City, N. Y. By-Product Plants Koppers Co., Engineering & Construc-tion Div., Pittsburgh.

Cabinets—Filing
All-Steel-Equip Co., Inc., 702 John St.,
Aurora, Ill.

Cabinets—Wardrobe
All-Steel-Equip Co., Inc., 702 John St.,
Aurora, Ill.

Cable—Electric

American Steel & Wire Co. (U. S. Steel
Corp. Subsidiars), Cleveland, Ohio,
General Electric Co., Schenetady, N. Y.
Lincoln Electric Co., The. Cleveland,
Roebling's, John A., Sons Co., Trenton,
N. J.

Calcium Metal & Alloys
Electro Metallurgical Sales Corp., 30
East 42nd St., N. Y. C.

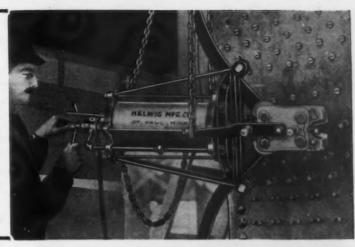
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Carbide

Air Reduction, 60 East 42nd St., N. Y. C. Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

Carbon—Brick & Powder
National Carbon Co., Inc., Carbon Sales
Div., Cleveland, Ohio.

Carburizing Boxes
Electro Alloys Co., The, Elyria, Ohio.

Cars—Dump
Pressed Steel Car Co., Inc., Koppel
Div., Pittsburgh, Pa.

Carnegle-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicage.

Heyl & Patterson, Inc., Pittsburgh.
Pressed Steel Car Co., Inc., Koppel Div., Pittsburgh, Pa.

Cors—Ladle, Cinder & Slag
Koppers Co., Bartlett Hayward Div.,
Baltimore, Md.
Pennsylvania Engineering Works, New
Castle, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Pollock, Wm. B., Co., The, Youngstown, Ohio.
Pressed Steel Car Co., Inc., Koppel
Div., Pittsburgh, Pa.

Gars—Passenger, Railway Budd, Edward G., Mfg. Co., Philadel-phia, Pa. Pressed Steel Car Co., Inc., Pittsburgh, Pa.

Cars—Railway
Iron & Steel Products, Inc., Chlcago.
Pressed Steel Car Co., Inc., Pittsburgh,
Pa.

Casters
Darnell Corp., Ltd., Long Beach, Calif.

Gastings—Acid or Heat Resisting
Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Ampco Metal, Inc., Milwaukee, Wla.
Coast Metals, Inc., Canton, Ohio.
Cramp Brass & Iron Foundries Div. of
The Baldwin Locomotive Wks., Philadelpfila.
Electra Alloys Co., The, Elyria, Ohio.
Hoskins Mfg. Co., Detroit. Mich.
Lebanon (Pa.) Steel Foundry.
Meehanite Research Institute, Pittsburgh, Pa. Lebanon (Pa.) Steet Foundation Mechanite Research Institute, Pittsburgh, Paroducts Corp., Michigan City, Ind. The Nicetown, Phila., Pa Ohio Steel Foundry Co., Lima, Ohio. Wall-Colmonoy Corp., Detroit, Mich.

-Alloy Steel Foundry Co., The, Dayton, Ohio, Birdsboro (Pa.) Steel Foundry & Ma-Birdsboro (Pa.) Steel Foundry & Machine Co.
Electro Alloys Co., The, Elyria, Ohlo.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Michlana Products Corp., Michlana
City, Ind.
National-Erie Corp., Erie, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Taylor-Wharton Iron & Steel Co., High
Bridge, New Jersey.
Uniteast Corp., Toledo, Ohlo.

Castings—Brass, Bronze, Copper or Aluminum
Aluminum Co, of America, Pittsburgh, Bunting Brass & Bronze Co., The, Toledo, Ohio.
Cadman, A. W., Mfg. Co., Pittsburgh, Columbus (Ohio) Brass Mfg. Co., The, Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia delphia.

Hedstrom, Oscar W., Corp., Chicago,
III. III.
coppers Co., Bartlett Hayward Div.,
Baltimore, Md.
ational Bearing Metals Corp., Pitts-National Bearing Metals Corp., Pitti-burgh, Shenango-Penn Mold Co., Dover, Ohlo. Spencer's. I. S., Sons, Inc., Guil-ford, Ct. United States Bronze Sign Co., Inc., 570 Broadway, New York City.

Castings—Die Aluminum Co. of America, Pittsburgh.

Mount Vernon (New York) Die Cast-ing Corp. Titan Metal Mfg. Co., Bellefonte, Pa.

Castings—Electric Steel ustings—Electric Steel Continental Roll & Steel Foundry Co., East Chicago, Ind. Crucible Steel Castings Co., Lansdowne, Pa. Lebanon (Pa.) Steel Foundry. National-Eric Corp., Eric, Pa. Ohio Steel Foundry Co., Lima, Ohio. Uniteast Corp., Toledo, Ohio.

Castings—Gray Iron and Semi-Steel
Advance Foundry Co., The, Dayton, Ohlo.
Allis-Chalmers Mfg. Co., Milwaukee,
Wis.

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Engineering Co., Philadelphia.
Cox & Sons Co., The, Bridgeton, N. J.
Cramp Brass & Iron Foundries Div. of
The Baldwin Locomotive Wks., Philadelphia.
Etna Machine Co., The, Toledo, Ohio.
Eyster, Weiser Co., York, Pa.
Hill Acme Co., The, Cleveland, Ohio
Koppers Co., Bartlett Hayward Div.,
Baitimore, Md.
Lobdell Car Wheel Co., Wilmington,
Del.
National Roll & Fdry. Co., Avonmore,
Pa.

Pa. orth Wales (Pa.) Mach Co., Inc. pencer's, I. S. Sons, Inc., Guilford, Ct.

astings—High Test & Alloy Iron
Cramp Brass & Iron Foundries Div. of
The Baidwin Locomotive Wks., Philadelphia.
Mechanite Research Institute, Pittsburgh, Pa.
Michians Products Corp., Michigan
City, Ind.

Castings—Magnesium Alloys
American Magnesium Corp., 1701 Guif
Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson
Ave., Midland, Mich.

Castings—Malleable
Lake City Malleable Co., The, 5100
Lakeside Avc., Cleveland.
Peorla (III.) Malleable Castings Co.

Castings—Manganese Steel
Taylor-Wharton Iron & Steel Co., High
Bridge, New Jersey.

Castings—Meehanite Metal Meehanite Research Institute, Pitts-burgh, Pa.

Castings—Monel & Nickel
Cramp Brass & Iron Foundries Div. of
The Baldwin Locomotive Wks., Phildelphia.

Castings—Phosphor Bronze
Phosphor Bronze Smelting Co., The,
Philadelphia, Pa.

Castings—Steel
Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Rolling Mill Co., The, Middletown, Ohlo.
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Change (Pa.)

dictown, Ohio.
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Roll & Steel Foundry Co., East Chicago. Ind.
Crucible Steel Castings, Lansdowne, Pa.
Erle (Pa.) Forge Co.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co. Pittsburgh,
Mesta Mch. Co., Pittsburgh,
Michlana Products Corp., Michigan
City, Ind.
National-Erle Corp., Erle, Pa.
Ohio Steel Foundry Co., Lima, Ohio.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Standard Steel Wks. Div. The Baldwin
Locomotive Works, Phila., Pa.
Strong Steel Foundry Co., Buffalo, N. X.
Uniteast Corp., Toledo, Ohio.

Castings—Wear Resisting
Coast Metals, Inc., Canton, Ohio,
Mechanite Research Institute, Pittsburgh, Pa.
Taylor-Wharton Iron & Steel Co., High
Bridge, New Jersey,
Wall-Colmonoy Corp., Detroit, Mich.

Cement—Acid-Proof
Nukem Products Corp., 68 Niagara St., Nukem Products Corp., 68 Niagara St., Buffalo, N. Y. Pennsylvania Sait Mfg. Co., Philadel-phia, Pa.

ment—Refractory
Babcock & Wilcox Co., The, 85 Liberty
St., New York City.
Carberundum Co., The, Perth Amboy, N. J.
hins-Manville Corp., 22 East 40th St.,
New York City.

Centering Machines
Hendey Machine Co., Torrington. Conn.
Jones & Lamson Machine Co., Springfield, Vt.,
Sundstrand Machine Tool Co., Rockford,
Ill.

Chains—Conveyor & Elevator Heyl & Patterson, Inc., Pittsburgh. Link-Belt Co., 220 So, Belmont Ave. Indisnapolis, Ind.

Chains—Power Transmission
Link-Belt Co., 220 So. Belmont Ave.,
Indianapells, Ind.
Morse Chain Co., Ithaca, N. Y.
Whitney Chain & Mfg. Co., Hartford, Ct.

Chains—Welded
American Chain & Cable Co., Inc.,
York, Pa.

Chamfering Machines (Gear)
Cross Gear & Machine Co., Detroit, Mich.
Sheffield Corp., The, Gage Div., Dayton. Ohlo.

Channels—See Angles

Charging Machines
Brosius, Edgar E., Inc., Sharpsburg
P. O. Pittsburgh, Pa.

Checks-Metal Cunningham, M. E., Co., Pittsburgh, Pa. Noble & Westbrook Mfg. Co., The, E. Hartford, Coun.

Chemicals—Industrial
Koppers Co., Tar & Chemical Div.,
Pittsburgh, Pa.
Pennsylvania Salt Mfg. Co., Philadeiphia, Pa.
Cobalt Metal
Central Tradi

Cleveland (Ohio) Punch & Shear Works Coiling Machinery—Wire Spring Torrington (Conn.) Mfg. Co., The Cleveland Steel Tool Co., The, 660 East 82nd St., Cleveland, Ohio.

Chromium Metal & Alloys
Electro Metallurgical Sales
East 42nd St., N. Y. C.

Chucking Machines

Baird Mch. Co., The, Bridgeport, Conn.
Cleveland (Ohio) Automatic Machine
Co., The. Co., The.
Gisholt Machine Co., Madison, Wis.
Goss & DeLeeuw Machine Co., New
Britain, Conn.
Jones & Lamson Machine Co., Springfield, Vt. field, Vt.

National Acme Co., The, Cleveland.

New Britain-Gridley Machine Div.,

The New Britain Machine Co., New

Britain, Conn.

Potter & Johnston Machine Co. Paw
tucket, R. I.

Chucks—Air Operated
Logansport (Ind.) Machine,
Tomkins-Johnson Co., The,
Mich.
Mich.

Chucks—Drill
Cleveland (Ohio) Twist Drill Co.,
The.
Cushman Chuck Co., Hartford, Conn.
Millers Falls Co., Greenfield, Mass.
Morse Twist Drill & Mach Co., New
Bedford, Mass.
North Bros. Mig. Co., Philadelphia, Pa.

Chucks—Lathe
Cushman Chuck Co., Hartford, Conn.
Gisholt Machine Co., Madison, Wis.
Jones & Lamson Machine Co., Springfield, Vt.

Chucks—Magnetic

Brown & Sharpe Mfg. Co., Providence,
R I

Heald Machine Co., The, Worcester, Mass.
Taft-Peirce Mfg. Co., The, Woonsocket,
R. I.

Clay Guns
Balley, Wm. M., Co., Pittsburgh, Pa.
Brosius, Edgar E., Inc., Sharpsburg
P. O. Pittsburgh, Pa.

Cleaners-Metal

American Chemical Paint Co., Ambler, American Chemical Paint Co., Ambler, Pa., Pa., Sales Co., The, Wyandotte, Mich, Houghton, E. F., & Co., Philadelphia, Pa., MacDermid, Inc., Waterbury, Conn., Oakite Products, Inc., 22 Thames St., New York City.

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Cleaners, Vacuum—Industrial
Spencer Turbine Co., Hartford, Conn.

Cleaning Equipment (Metal)—Elec-tro-Chemical
Bullard-Dunn Div., The Bullard Co.,
Bridgeport, Conn.,
Meaker Co., The, Chicago, Ill.

Clutches

Dodge Mfg. Corp., Mishawaka, Ind.
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The,
Cuyahoga Falls, Ohio.
Hill Acme Co., The, Cleveland, Ohio.
Hilllard Corp., The, Elmira, New York.
Johnson, Carlyle, Machine Co., Manchester, Conn.
Morse Chain Co., Ithaca, N. Y.
Twin Disc Clutch Co., Racine, Wis.

-Magnetic Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., 517 E.
Smith St., Milwaukee.
Stearns Magnetic Mfg. Co., 635 So.
28th St., Milwaukee.

Cool
Cleveland-Cliffs Iron Co., The, Cleve
land, Ohio.
Koppers Coal Co., The, Pittsburgh,
Oglebay, Norton & Co., Cleveland, Ohio,
Pickands Mather & Co., Cleveland,
Ohio.

Coal, Ore & Ash Handling Machinery Alliance (Ohio) Machine Co., The. Heyl & Patterson, Inc., Pittsburgh, Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

Central Trading Corp., 511 Fifth Ave., N. Y. C.

Coke—Metallurgical
Cleveland-Cliffs Iron Co., The, Cleveland, Ohlo,
Koppers Co., Gas & Coke Div., 60 East
42nd St., New York City.
Pickands Mather & Co., Cleveland,
Ohlo.

Coke Oven Machinery

Koppers Co., Engineering & Construction Div., Pittsburgh.

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Leeds & Northrup Co., 4956 Stenton
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Morgan Construction Co., Worcester,
Mass.
North American Mfg. Co., The, Cleveland, Ohlo.

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Ideal Commutator Dresser Co., Sycamore, Ill.

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Allis-Chalmers Mfg. Co., Milwaukee, Allis-Chalmers Mfg. Co., Milwaukes, Wis.
Curtis Pneumatic Mchry. Div. of Curtis Mfg. Co., 1948 Kienlen Ave., St. Louis, Mo.
DeVilbiss Co., The, Toledo, Ohio.
Psirbanks, Morse & Co., Chicago.
Spencer Turbine Co., Hartford, Conn.
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Harrison, New Jersey.

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Clark Controller Co., The, Cleveland.
Culter-Hammer, Inc., Milwaukee.
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Cleveland. Electric Controller & Mfg. Co., The, Cleveland. General Electric Co., Schenectady, N. Y.

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Link-Belt Co., 300 West Pershing
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Hubbard, M. D., Spring Co., 329 Central Ave., Pontiac, Mich.

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Cleveland (Ohio) Twist Drill Co., The.

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Morse Chain Co., Ithaca. N. Y.
Poole Foundry & Mch. Co., Baltimore,
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National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

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Harnischfeger Corp., 4401 W. National
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Industrial Browshojst Corp., Bay City, Are., Milwaukee.
Industrial Brownhoist Corp., Bay City,
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Osgood Co., The, Marion, Ohio.

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Westinghouse Electric & Mfg. Co., East
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Worthington Pump & Machinery Corp.,
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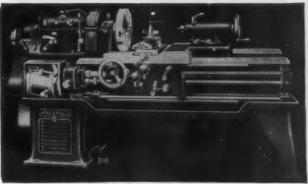
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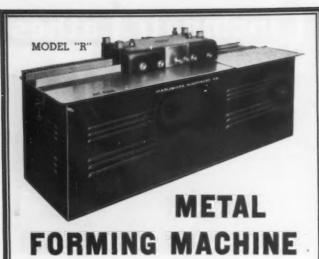
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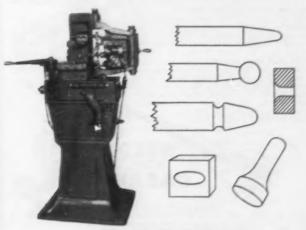
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Filters—Oil
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Filters—Oil, Magnetic Frantz, S. G., Co., Inc., 159-161 Grand St., New York City.

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MODEL

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Lovejoy Flexible Counting Co.. 4979
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New Jersey.

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Nukem Products Corp., 68 Niagara St.,
Buffalo, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

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Stewart Furnace Div., Chicago Flexible
Shaft Co., Chicago.

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Pennsylvania Engineering Works, New
Castle, Pa.
Swindell-Dressler Corp., Box 1888,
Pittsburgh, Pa.

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Youngstown, Ohio.
Swindell-Dressler Corp., Box 1888,
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Wean Engineering Co., Inc., The, Warren, Ohio.

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R. I. Gages—Sheet Thickness
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Fellows Gear Shaper Co., Springfield.
Vt.

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Shaft Co., Chicago.
Surface Combustion Corp., 2375 Dorr
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Gear Shaving Machines Michigan Tool Co., Detroit, Mich. National Broach & Machine Co., De-troit, Mich.

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Cone-Drive Div., Michigan Tool Co., Detroit, Mich.
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N. Y. ws Gear Shaper Co., Springfield. V:
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The.

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Air Reduction, 60 East 42nd St.,
N. Y. C.
Linde Air Products Company, The, 30
East 42nd St., N. Y. C.

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Allia-Chalmers Mfg. Co., Milwaukee,
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American Optical Co., Southbridge,

Mass.

Industrial Gloves Co., Danville, III.

Goggles—Safety
American Optical Co., Southbridge,
Mass.

Graduating Machines—Metal Noble & Westbrook Mfg. Co., The, E. Hartford, Conn.

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Blaw-Knox Div. of Blaw-Knox Co.,
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Borden Metal Products Co., Elizabeth,
New Jerses.
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Walker-Turner Co., Inc., Plainfield,
New Jersey.

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Rapids, Mich.
Oliver Instrument Co., Adrian, Mich.
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Pond Co., West Hartford, Conn.

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Grinding Machines—Internal Multi-ple Spindle Baird Mch. Co., The, Bridgeport, Conn.

Grinding Machines—Knife & Shear Blade Harris-Seybold-Potter Co., Dayton, Ohio. Hill Acme Co., The, Cleveland, Ohio.

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Rotor Tool Co., The, Cleveland, Ohio,
Schauer Machine Co., Cincinnati, Ohio.

Grinding Machines-Portable Pneu-Rotor Tool Co., The, Cleveland, Ohio.

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Hapids, Mich.
General Machinery Corp., Boston, General Machinery Corp., Dosson,
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Waterbury (Conn.) Farrel Foundry &
Machine Co., The.

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Corp., Lockport, N. Y.
Niagara Blower Co., Buffalo, New York.

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Barnes, Wallace Co., Div. of Associated Spring Corp., Bristol, Conn.
Flame Treating & Engineering Co.,
The, Hartford, Conn.
General Machine Wks., York, Pa.
Parish Pressed Steel Co., Reading, Pa.
Fennsylvania Industrial Engineers,
Pittsburgh.
Standard Steel Spring Co., Coraopolis,
Pa. Pa.
Van Dorn Iron Works Co., The, Cleveland, Ohio.
Woodworth, N. A., Co., Detroit, Mich.

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Brown & Sharpe Mfg. Co., Providence, R. I.

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Curtis Pneumatic Mchry, Div. of Curtis
Mfg. Co., 1948 Kienlen Ave., St.
Louis, Mo.
Detroit (Mich.) Hoist & Mach. Co.
Northern Engineering Works, Detroit.

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& Cable Co., Inc., Philadelphia, Pa.
Reading (Pa.) Chain & Block Corp.
Yale & Towne Mfg. Co., The, Phila.
Div., Phila., Pa.

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American Engineering Co., Philadel-American Engineering Co., Philadelphia.
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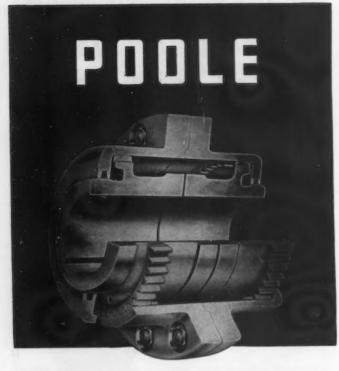
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American Brass Co., The, Waterbury,

Hose—Rubber
DeVilbias Co., The, Toledo, Ohio.
Hewitt Rubber Corp., Buffalo, N. Y.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2
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Denison Engineering Co., The, 108 W.
Chestnut St., Columbus, Ohio.
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Lake Eric Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
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Iron-Swedish Swedish-American Steel Corp., 427 Kent Ave., Brooklyn, New York.

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Western Wire Prods. Co., St. Louis,
Mo.

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Bullard Co., The, Bridgeport, Conn.
Cross Gear & Machine Co., Detroit,
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Gisholt Machine Co., Madison, Wis.
Goss & De Leeuw Mch. Co., New
Britain, Conn.
einnat.
Jones & Lamson Mch. Co., Springfield, Vi.
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Fotter & Johnston Machine Co., Pawtucket, R. I.
Sundstrand Machine Tool Co., Rockford, Ill.

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Potter & Johnston Machine Co., Pawtucket, R. I.

Lathes—Automatic Vertical
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Bullard Co., The, Bridgeport, Conn.

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Pratt & Whitney Div. Niles-BementPond Co., West Hartford, Conn.
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Bullard Co., The, Bridgeport, Conn.
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Simmons Machine Tool Corp., Albany,
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South Bend (Ind.) Lathe Works, 587
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Warner & Swasey Co., The, Cleveland.

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National Lead Co., 111 Bdway.,
N. Y. C.

Leggins—Sufety
American Optical Co., Southbridge,
Mass.

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McKay Machine Co., The, Youngstown,
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Schatz Mfg. Co., The, Poughkeepsie
N. Y.
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ren, O.

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Gulf Oil Corp., Gulf Refining Co.,
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Houghton, E. F., & Co., Philadelphia,
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R. I.
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Dow Chemical Co., The, 921 Jefferson
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Dings Magnetic Separator Co., 517, East
Smith St., Milwaukee,
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Bridge, N. J.

Magnets—Separating—See Separa-

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Metal Specialties—See Stampings

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Meters-Water & Oil
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Cross Gear & Machine Co., Detroit,
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Oglebay, Norton & Co., Cleveland, Ohio.
Pickands Mather & Co., Cleveland,
Child

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Despatch Oven Co., Minneapolis, Minn.
Holcroft & Co., Detroit, Mich.
Kirk & Blum Mg. Co., The, Cincinnati, Ohio.
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Stewart Furnace Div. Chicago Flexible
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Ovens—Core and Mold Despatch Oven Co., Minneapolis, Minn. Holcroft & Co., Detroit, Mahon, R. C., Co., Detroit, Mich.

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Oxygen

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Linde Air Products Company, The, 30

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Pressed
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elt Co., Glenville, Conn.

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Excelsior Leather Washer Mfg. Co.,
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Garlock Packing Co., The, Palmyrs,
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Rhoads, J. E., & Sons, Philadelphia,
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Youngstown, Ohlo.
Meaker Co., The, Chicago, Ill.
Mesta Mch. Co., Pittsburgh.

Pickling Tank Linings Cellcote Co., The, Cleveland, Ohio, National Lead Co., 111 Bdway, N. Y. C.

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National Carbon Co., Inc., Carbon Sales
Div., Cleveland, Ohio.

Piston Rings
Koppers Co., American Hammered Piston Ring Div., Baltimore, Md.

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Bethlehem (Pa.) Steel Company.

Brooke, E. & G., Iron Co., Birdsboro,
Pa. Bethlehem (Pa.) Steel Comp. (U. S. Steel Corp. Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Hanna Furnace Corp., The, Ecorse, Detroit, Mich.

Jackson (Ohio) Iron & Steel Co., The.
Jones & Laughlin Steel Corp., Pittsburgh.

Pickands Mather & Co., Cleveland, Ohio.

Laubile Steel Corp., Cleveland, Ohio. Pickands Mather & Co., Cleveland, Ohio.
Republic Steel Corp., Cleveland, Ohio.
Shenango Furnace Co., Pittsburgh, Pa.
Tennessee Coal, Iron & Italirod Co.
(U. S. Steel Corp. Subsidiary),
Birmingham, Ala.

Manhattan Rubber Mig. Destos-Manhattan, Inc., The. 2
Towsend St., Passaic, N. J.

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Van Dorn Iron Works Co., The, Cleveland, Ohio.

Pig Iron—Silvery
Jackson (Ohio), Iron & Steel Co., The. Plates—Iron or Steel
Alan Wood Steel Co., Conshohocken,

Pig Iron Casting Plants Heyl & Patterson, Inc., . Pittsburgh. Piling-Iron & Steel

American Rolling Mill Co., The, Middletown, Ohio.
Carnegie-Hilinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago Chicago.
Inland Steel Co., Chicago, Ill.
National Tube Co. (U. S. Steel Corp.
Subsidiary), Pittsburgh.

Pillow Blocks
Will Acme Co., The, Cleveland, Ohio,
Medart Co., The, St. Louis, Mo.

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Pinions-Wire and Rod Rathbone, A. R. & J., Palmer, Mass.

Carbon ational Carbon Co., Inc., Carbon Sales Div., Cleveland, Ohio.

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Wood, R. D., & Co., Philadelphia,
Pa.

Pipe—Lead Lined
National Lead Co., 111 Bdway.,
N. Y. C.

Pipe-Steel Albert & Davidson Pipe Corp., 2nd Ave, 50-51 St., Bklyn., N. Y.
Allegheny Ludium Steel Corp., Pitts-burgh, Pa.

Poissing wheels
Siefen, J. J., Co., Detroit, Mich.

Poissing wheels
Siefen, Mich.

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National Tube Co. (U. S. Steel Corp.

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Brooklyn, N. Y.

Wheeling (W. Va.) Steel Corp.

Youngstown (Ohio) Sheet & Tube Co.,

The,

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Harrisburg (Pa.) Steel Corp.
National Lead Co., 111 Bway., N. Y. C.
Swan Engineering Co., Inc., Newark,
N. J. N. J. Tubular Service Corp., 120 44th St., Brooklyn, N. Y.

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Auburn Steel Corp., 92 Liberty St.,
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Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
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Tool Engineering Service Co., Inc.,
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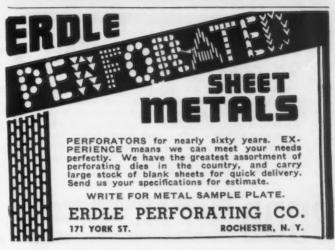
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Union Metal Mfg. Co., The, Canton,
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United Chromium Incorporated, 51 East
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Aluminum Co. of America, Pittsburgh.

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Kidd Drawn Steel Co., Aliquippa, Pa.

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American Magnesium Corp., 1701 Gulf
Bldg., Pittsburgh,
Dow Chemical Co., The, 921 J-fferson
Ave., Midland, Mich.

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New Haven, Conn.

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Co., The.

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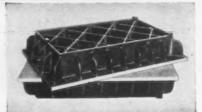


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Southern Galvanizing Co., Baltimore,
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te Corp., The, Detroit, Mich. Salt Tablets

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Suppler Co., St. Louis, Mo.

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Link-Belt Co., 300 West Pershing Road
Chicago, Ill.

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St., Indianapolis, Ind.

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Racine (Wis.) Tool & Machine Co.

Racine (Wis.) Tool & Machine Co.

Sawing Machines—Metal—Band

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Atkins, E. C. & Co., 406 So. Illinois

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Washington Are., Minneapolis, Minn.

Walker-Turner Co., Inc., Plainfield,

New Jersey,

Wells Mfg. Corp., Three Rivers, Mich.

Swing Machines—Power Hack
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Altins, E. C. & Co., 406 So. Illinois
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Ave., Racine, Wis.

Saws—Band for Metal

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Alkins, E. C. & Co., 406 So. Illinois

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Washington Ave., Minneapolis, Minn.

Disston, Henry, & Sons, Inc., Philadelphia, Pa.

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New Haven, Conn.
Wells Mfg. Corp., Three Rivers, Mich.

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Espen-Lucas Machine Works, Philadelphia, Pa.
Motch & Merryweather Machinery Co.,
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Peerless Machine Co., 1613 Junction
Ave., Racine, Wis.
Porter-McLeod Machine Tool Co., Inc.,
Hatfield, Mass.
Tabor Mfg. Co., Philadelphia.

Saws—Friction
Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Kling Bros. Engineering Works, Chicago, Ill.

Saws—Hack Saw Blades

cago, Ill.

Saws—Hack Saw Blades

Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C. & Co., 406 So. Illinois
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Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Millers Falls Co., Greenfield, Mass.
Peerless Machine Co., 1613 Junction
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Thompson, Henry G., & Son Co., The,
New Haven, Conn.

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2ws—Hot Metal

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Atkins, E. C. & Co., 406 So. Illinois

St., Indianapolis, Ind.

Disston, Henry, & Sons, Inc., Philadelphia, Pa.

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Iron & Steel Products, Inc., Chicago,
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Screens-Foundry
Allis-Chalmers Mfg. Co., Milwaukee.

Wls.
Wickwire Brothers, Inc., Cortland, New York.

Screens—Perforated Metal
Chicago Perforating Co., 2440 W. 24th
Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, New York. York.

Harrington & King Perforating Co.,
The, Chicago, Ill,
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas. A., Sons, 59 Fairmount
Ave., Jersey City, N. J.

Ave., Jersey City, N. J.

Screens—Woven Wire
Ludlow-Saylor Wire Co., St. Louis, Mo.
Wickwire Brothers, Inc., Cortland, New
York.
Wickwire Spencer Steel Co., 500 Fifth
Ave., N. Y. C.

Screw Driving Tools
North Bros. Mfg. Co., Philadelphia, Pa.

Screw Machine Products
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Eastern Mch. Screw Corp., New Haven,

Eastern Mch. Screw Corp., New Haven, Ct.
Mid-West Screw Products Co., 20 St. George St., St. Louis, Mo.
Miles, Franklin S., 2422-28 N. Mascher St., Phila., Pa.
National Acme Co., The, Cleveland.
New Britain-Gridley Machine Div., The
New Britain Machine Co., New
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Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa. Pa. Pa. Tools, Philadelphia, Pa. Reliance Machine & Mrg. Co., 30 Irving Place, N. Y. C. Rhode Island Tool Co., Providence, R. I.
Shimer, Samuel J., & Sons, Inc., Milton, Pa.
Wicaco Machine Corp., The, Philadelphia, Pa.

Screw Machine Tools Hardinge Brothers, Inc., Elmirs, New

York. R & L Tools, Philadelphia. ns & 1 Tools, Philadelphia.

rew Machine-Tool Co., The, Cincinnati, Ohio.

Brown & Sharpe Mfg. Co., Providence,
R. J.

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Screw Machinery—Hand
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Warner & Swasey Co., The, Cleveland.

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Screws—Cap, Set, Safety Set & Ma-& Johnson Co., The, Waterville, Conn.
Cleveland (Ohio) Cap Screw Co., The.
Arper, H. M., Co., The, 2007 Fletcher
St., Chicago, Ill.
Lamson & Sessions Co., The, Cleveland.
Mid-West Screw Products Co., 20 St.
George St., St. Louis, Mo.
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Ottemiller, Wm. H., Co., Inc., York,
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Rhode Island Tool Co., Providence,
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Co., Port Chester, N. Y. . . Shimer, Samuel J., & Sons, Inc., Milton, Pa. Standard Pressed Steel Co., Jenkintown, Pa. Triplex Screw Co., Cleveland.

Screws-Recessed Head American Screw Co., Providence, R. I. Lamson & Sessions Co., The, Cleveland, Ohio. Ohio.
Parker-Kalon Corp., 200 Varick St.,
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Russell, Burdsall & Ward Bolt & Nut
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Screws—Self Tapping Drive
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Shakeproof, Inc., 2525 N. Keeler Ave.,
Chicago.

Sheet Metal Structures — Prefabricated

cated Dry-Zero Corp., Lindsay Structure Div., 232 North Bank Drive, Chicago, Ill. Smith St., Milwaukee.
Ohio Electric Mfg. Co., The, 5908
Maurice Ave.. Cleveland.
Stearns Magnetic Mfg. Co., 635 S. 28th
St., Milwaukee.
St., Milwaukee.
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Bliss & Laughlin, Inc., Harvey, Ill.;
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Erie (Pa.) Forge Co.
Jones & Laughlin Steel Corp., Pittsburgh.
LaSalle Steel Co., Chicago, Ill.
Moltrup Steel Products Co., Beaver
Falls, Pa.
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Union Drawn Steel Div. Republic Steel
Corp., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittaburgh.

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Cincinnati (Ohio) Shaper Co.
Cleveland (Ohio) Punch & Shear Works Co., The.
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Federal Bearings Co., Inc., The. Poughkeensie. N. Y.
Kling Rros. Engineering Works, Chicazo. III.
McKay Machine Co., The, Youngstown, Mesta Machine Co., Pittsburgh, Pa. Morgan Engineering Co., The, Alliance, O. O. Niagara Machine & Tool Works. Buffalo, New York.

Schatz Mfg. Co., The, Poughkeepsie, N. Y. e Tool & Mfg. Co., New Bremen. Streine Tool & ang. co., Ohio. United Engineering & Fdry. Co., Ptgh. Yoder Co., The, Cleveland, Ohio,

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Breakwater Ave., Cleveland, Ohio.

Shearing Machines—Rotary Cleveland (Ohlo) Punch & Shear Works Niagara Machine & Tool Works, Buffalo, N. Y.

Shearing Machines—Squaring
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Cleveland (Ohio) Punch & Shear Works
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Niagara Mach. & Tool Wks., Buffalo,
N.Y. Streine Tool & Mfg. Co., New Bremen, Ohio.

Sheet Lifters
Cullen-Friestedt Co., 1303 S. Kilbourn
Ave., Chicago.

Pa.

New York City.

Progressive Mfg. Co., The, Torrington, Conn.

Sheet Metal Fabrication
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Streine Tool & Mfg. Co., New Bremen,
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V & O Press Co., Hudson, N. Y.

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Jones & Laughlin Steel Corp., Pittsburgh.
Newport (Ky.) Rolling Mill Co., The,
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Republic Steel Corp., Cleveland, Ohlo,
Ryerson, Jos. T., & Son. Inc., Chicago.
Scully Steel Products Co. (U. S. Steel
Corp. Subsidiary), Chicago.
Sharon (Pa.) Steel Corp.
Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Birmingham, Ais.
Welton (W. Va.) Steel Corp.

Sheets-Blue Annealed
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American Rolling Mill Co., The, Middletown, O., Bethlehem (Pa.) Steel Company.

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Granite City (Ill.) Steel Co.

Ryerson, Jos. T., & Son, Inc., Chicago.

Sharon (Pa.) Steel Corp.

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Park Ave., New York City.
Seymour (Conn.) Mfg. Co., The,

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Sheets—Copper Steel
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Whitney Chain & Mfg. Co., Hartford, Ct.

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Greist Mfg. Co., The, 646 Blake St.,
New Haven, Conn.

Eastern Tool & Stpg. Co., Inc., Saugus, Mass.

Grelst Mfg. Co., The, 646 Blake St.,
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Harrison Sheet Steel Co., Chlcago, Ill.
Heintz Mfg. Co., Philadelphia, Pa.
Hubbard, M. D., Spring Co., 239 Central Ave., Pontiae, Mich.
Hunter Pressed Steel Co., Lansdale, Pa.
Lansing (Mich.) Stamping Co., So.,
Penn. Ave.
Lee Snring Co., Inc., 30 Main St.,
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New England Pressed Steel Co., Natick,
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Newell Mfg. Co., The, Ogdensburg,
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Parish Pressed Steel Co., Reading, Pa.
Raymond Mfg. Co., Div. of Associated
Spring Corp., Corry, Pa.

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Sessions, J. H., & Son, Hooker Court,
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Shakeproof, Inc., 2525 N. Keeler Ave.,

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Specialties Mfg. Co., 35 Farrand St., Bloomiteld, N. J.

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Transue & Williams Steel Forgins Corp., Alliance, Ohlo.

Truscon Steel Co., Pressed Steel Div., Cleveland, Ohlo.

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E. Hartford, Conn.

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Wickwire Brothers, Inc., Cortland,
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Tennessee Coal, Iron & Railroad Co.,
(U. S. Steel Corp. Subsidiary),
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Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Vanadium-Alloys Steel Co., Latrobe,
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Pa. Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Youngstown (Ohio) Sheet & Tube Co.,
The.

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LaSalle Steel Co., Chicago, Ill.
Moltrup Steel Products Co., Beaver
Falls, Pa,
Union Drawn Steel Div. Republic Steel
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Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Wyckoff Drawn Steel Co., Pittsburgh.

Steel-Cobalt
Darwin & Milner, Inc., Cleveland.

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Steel—Cold Drawn

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Frasse, Peter A., & Co., Inc., 17 Grand
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Jones & Laughlin Steel Corp., Pittshurch

burgh.
Kidd Drawn Steel Co., Allquippa, Pa.
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Moltrup Steel Products Co., Beaver
Falls, Pa.
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Cruchle Steel Co. of America, Chrysler Bldg., N. Y. C.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
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Milne, A., & Co., 745 Washington St., New York City.
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Carpenter Steel Co., The, 121 W. Bern St., Iteading, Pa.
Copperweld Steel Co., Warren, Ohio. Crucible Steel Co. of America, Chrysler Bidg., N. Y. C.
Disston, Henry, & Sons, Inc., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Steel—High Speed
Allegheny Ludium Steel Corp., Pittsburgh, Pa.
Boker, H., & Co., Inc., 101 Duane St., New York City.
Carpenter Steel Co., The, 121 W. Bern St., Iteading, Pa.
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Superior Steel Corp., Carnegie, Pa.
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freel—Strip
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Steel Corp. Subsidiary), Pittsburgh
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Superior Steel Corp., Carnegle, Pa.
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New York Engineering Co., 75 West
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Etna Machine Co., The, Toledo, Ohio.
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Adam. Frank Electric Co., St. Louis. Mo.
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Hartford (Conn.) Special Machinery
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Precision Thread Grinding Co., Detroit,
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Hendrick Mfg. Co., Carbondale, Pa.
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Mfg. Co., 1948 Kienlen Ave., St.
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Butler-Bin Co., Waukesha, Wis.

Trucks—Hand Standard Pre Pressed Steel Co., Jenkin-

Standard Pressed Steel Co., Jenkintown, Pa.

Trucks—Lift

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Automatic Transportation Co., 75 W.

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Baker-Raulang Co., The, 2175 W. 25th

St., Cleveland. Ohio.

Elwell-Parker Electric Co., The, Cleveland, Ohio.

Yale & Towne Mfg. Co., The, Philadelphia, Div., Phila., Pa.

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Atlas Car & Mfg. Co., The, Cleve-

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St., Cleveland, Ohlo.

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Continental Roll & Steel Foundry Co.,
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Taylor-Wilson Mfg. Co., 25 Thomson
St., McKees Rocks, Pa.
United Engineering & Fdry. Co., Ptgh.
Waterbury (Con.) Farrel Foundry &
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Machine Co., The.

Tube Mill Machinery—Welded
Continental Roll & Steel Foundry Co.,
East Chicago, Ind.
McKay Machine Co., The, Youngstown,
Ohio.

Tubes—Boiler
Jones & Lauphin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp.,
Subsidiary), Pittsburgh,
Pittsburgh (Pa.) Steel Co.
Steel & Tubes Div. of Republic Steel
Corp., Cleveland.
Tubular Service Corp., 120 44th Street,
Brooklyn, N. Y.

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Nickel Silver
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Conn.
Lewin-Mathes Co., East St. Louis III.

Conn.
Lewin-Mathes Co., East St. Louis, Ill.
Phosphor Bronze Smelting Co., The,

Phosphor Bronze Smeiting Co., The, Phila., Pa.
Plipe & Tube Products, Inc., Jersey City, N. J.
Revere Copper & Brass. Inc., 230 Park Ave., New York City.

Tubes—Heaf Exchanger
Steel & Tubes Div. of Republic Steel Corp., Cleveland, Ohio.
Tubular Service Corp., 120 44th Street, Brooklyn, N. Y.

Tubes—High Carbon
Steel & Tubes Div. of Republic Steel Corp., Cleveland, Chilary Steel Corp., 120-44th St., Brooklyn, N. Y.

Tubes—Steinless Steel

Brooklyn, N. Y.

Tubes—Stainless Steel
Allegheny Ludium Steel Corp., Pitts-burgh, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York City.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh, Ph. Pittsburgh (Pa.) Steel Co., Ryerson, Jos., T., & Son, Inc., Chicago. cago.
Steel & Tubes Div. of Republic Steel
Corp., Cleveland.

Tubular Service Corp., 120 44th Street, Brooklyn, N. Y,

Tubing—Aluminum Seamless
Aluminum Co. of America, Pittsburgh.

Tubing—Copper Coated or Tinned Steel andy Tubing Co., Detroit, Mich.

Bundy Tubing Co., Detroit, Mich.

Tubing—Magnesium Alloys
American Magnesium Corp., 1701 Gulf
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Dow Chemical Co., The, 921 Jefferson
Ave., Midland, Mich.
Inbing—Monel
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International Nickel Co., Inc., 67 Wall
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Tubing—Open Scom
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Corp., Clereland.
Tubular Service Corp., 120-44th St.,
Brooklyn, N. X.

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[ubinq—Seamless Steel

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Frasse, Peter A., & Co., Inc., 17 Grand
St., New York City.

Jones & Laughlin Steel Corp., Pittaburgh. burgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., The, Shelby, Ohio. Ohio.

Pipe & Tube Products, Inc., Jersey City, N. J.

Pittsburgh (Pa.) Steel Co.

Ryerson, Jos. T., & Son, Inc., Chi-Ryerson, Jos. T., & Son, Inc., Chi-cago.

Timken Roller Bearing Co., The, Can-ton, O.

Timken Steel & Tube Div., The Tim-ken Roller Bearing Co., Canton, O.

Tubular Service Corp., 120 44th Street, Brooklyn, N. Y.

Youngstown (Ohio) Sheet & Tube Co., The.

The.

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Standard Tube Co., The, Detroit, Mich.
Steel & Tubes Div. of Republic Steel
Corp., Cleveland.
Tubular Service Corp., 120 44th Street,
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Tubing—Welded Steel

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Jones & Laughlin Steel Corp. Pittsburgh,
National Tube Co. (U. S. Steel Corp.

Subsidiary), Pittsburgh,
Ohlo Seamless Tube Co., The, Shelby,
Ohlo, Tube Co.

Oblo.
Standard Tube Co., The, Detroit, Mich.
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Corp., Cleveland.
Tubular Service Corp., 120 44th Street,
Brooklyn, N. Y.
Youngslown (Obio) Sheet & Tube Co.,

Tubular Products

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386-404 Mountain Grove Street Bridgeport, Conn., U.S.A.

ELECTRIC STEEL

1/4 to 4000 lbs. in weight

THE HARTFORD ELECTRIC STEEL CORPORATION

540 Flatbush Ave., Hartford, Conn.

SCREW MACHINE PRODUCTS

- Brass - Aluminum In Steel -Up to 21/4" dia. 26th Year of Service

TRY OLSON OLSON MFG. CO.

53 Commercial St. Worcester, Mass.

Offices: New York City-Philadelphia, Pa.

EST. 1860

FRANKLIN S. MILES, Mfg. HAND-AUTOMATIC

SPECIAL SCREW MACHINE PRODUCTS All Parts turned from BAR STOCK in all metals from /g" te 2" in Dia. Any length turned up to 10" long. 2422-28 N. Mascher St., Philadelphia, Pa.

SPECIAL SCREW MACHINE

PRODUCTS made to order 1/16-17/8 diameter, in steel only. THREADED RODS, all metals, 10 to 12 ft. lengths.

The Eastern Machine Screw Corp. New Haven, Connecticut

CREW MACH. PRODUCTS SPRINGS & WIRE FORMS

Write on letterhead for valuable book on screw machine and wire products. Estimates will be furnished promptly. THE PECK SPRING CO., PLAINVILLE, CT.

Hollow Bored Forgings
Lathe and Milling Machine Spindles
Hydraulic Cylinders
Let us have your inquiries on any requirements of
Hollow Bored Fergings and Steel Shafts.

AMERICAN HOLLOW BORING COMPANY 1912 RASPBERRY STREET, ERIE, PENNA.



WE HAVE CAPACITY FOR EARLY 1942 SHIPMENT OF U.S. NAVY 5" SHELL FUSE HOLE NOSE PLUGS

OLIVER IRON AND STEEL CORPORATION SOUTH TENTH AND MURIEL STREETS PITTSBURGH, PENNSYLVANIA

HIGH GRADE SCREW MACHINE PRODUCTS



SEMI-FINISHED HEX NUTS SPECIAL SCREWS TO ORDER

MID-WEST SCREW PRODUCTS CO. 20 St. George St.



Those idle machines need to be put to work this year. Advertise here if you want to find war work for them.

- SUB-CONTRACTING -

SPECIAL MACHINERY

built to order

GEARS of every description

GEAR, CAM & THREAD grinding

AERONAUTICAL PARTS on contract

Send blue prints for estimate THE HARTEORD SPECIAL MCHRY, CO. Hartford, Connecticut

WANTED

Business for our 27-acre Plant in Calumet District

Steel Fabricating and Welding Equipment.
Pickling and Oiling Facilities too.

Storage: Inside and Outside. Three miles of R.R. Trackage.

IRON & STEEL PRODUCTS, Inc.

13496 S. Brainard Ave., Chicago, Illinois "ANYTHING containing IRON or STEEL"

NON-FERROUS FORGINGS

Brass—Bronze—Copper—Aluminum Smooth Forged—Machined—Finished All Shapes—Sizes—Alloys

THE HARVEY METAL CORPORATION 74th ST. and ASHLAND AVE. CHICAGO. ILLINOIS

OUALITY STEEL FORGINGS

Since 1881 Plus

dependable service

Herbrand 1500 STONE STREET, FREMONT, OHIO

DEFENSE WORK

Brass, Bronze, Aluminum Castings. Hand Screw Machine for 4 Spindle National Acme Screw Machines 3/4" Capacity.

STERLING FAUCET COMPANY Morgantown, W. Va.

Grey Iron, Nickel, Chrome and Molybdenum Alloy.

Semi-Steel Castings

Superior quality machine or hand molded, sand blasted or tumbled. On good tonnage we will make special molding equipment that will warrant you the best price and most efficient service. Patterns made of wood, brass, aluminum or iron.

Grinding wheel machinery, hack saw machines. Huntington emery wheel dressers and cutters, drill press vises, wire rod cutters.

press vises, wire rod cutters

NORTH WALES MACHINE CO., INC.

Phone 823

North Wales, Montg. Ce., Pa.

22 Miles from Philadelphia, Pennsylvania

CASTINGS & WELDMENTS

Meehanite (Iron) and Steel Castings. Cement-Molded by the Rardusson Process. Complete design and production facilities for all types of welded machinery parts. Pattern-making, machining and annealing.

FARREL-BIRMINGHAM COMPANY, Inc. 100 Main St., Ansonia, Conn.

Our defense contracts soon will be completed. Forging and heat-treating work wanted for forging hammers and forging rolls.

ADDRESS BOX W-850

Care The Iron Age, 100 E. 42nd St., New York

STEEL RINGS



When you need steel rings (in sizes from $\frac{3}{8}$ " to 108") call on Dresser! We've been making rings for over 60 years. Our complete facilities (rolls, expanders, hydraulic presses, modern gas furnaces, automatic welding machines, etc.) plus our experience and ability, insure quick delivery of your job exactly as ordered.



Get complete details of our service and experience today. Send prints or samples for estimate.

DRESSER MANUFACTURING COMPANY

STEEL TANKS & BASES

WIRE ANNEALING RETORTS

ALL TYPES METAL FABRICATION

SEND US YOUR DRAWINGS

NEWARK OXWELDING CO., INC.

91 Poinier St., Newark, N. J.

Brass, Bronze, Copper and Aluminum bar and casting machinery, with emphasis on Marine Hardware and high pressure cast fittings, is our specialty. Send us prints, samples or models for our foundry and machine shop to quote on.

SPECIALTIES MANUFACTURING CO.
Dept. 1A 35 Ferrand St. Bloomfield, N. J.

TOOLS, DIES, JIGS, FIXTURES SPECIAL MACHINERY

ALSO
MACHINE SHOP FACILITIES FOR
SMALL LOT PRODUCTION WORK DURABILT TOOL & MFG. CORPORATION

38-75 11th St., Long Island City, N. Y.

SPECIAL MACHINERY DIAMITE Abrasive Resistant Castings NI-RESIST Heat & Corrosion Resistant

Castings

M G BRONZE High Strength Acid Reeistant Castings sistant Castings Fully Equipped Pattern Foundry & Machine Shop Facilities—Castings to 15 tons. Weatherly Foundry & Mfs. Ce., Weatherly, Pa.

Contract Machine Work

Parts and Complete Machines. Heat Treating and Grinding. Mail Blue Prints for Quotations. GENERAL MACHINE WORKS

York. Pa.

IRK&

WELDED MACHINE BASES PEDESTALS and FRAMES LATHE PANS

GEAR and BELT GUARDS Pressed Steel Louver Panels and Cover Plates

THE KIRK & BLUM MFG. CO. 2821 Spring Grave Ave., Cincinnati, Ohio

Rolling space available

on 10" Mill for rerolling billets into rounds or squares, $\frac{1}{2}$ " to $\frac{1}{2}$ " diameters, also flats 1" to 4" wide. Prompt deliveries and attractive prices.

NICETOWN PLATE WASHER COMPANY, INC. Philadelphia, Penna

FLAME HARDENING

Prompt Service THE FLAME TREATING & ENGINEERING CO. Hartford, Conn.

SPECIALISTS IN STEEL FABRICATION

We weld rolled steel shapes in duplicating machinery parts and castings. Glad to quote on receipt of blueprints and specifica-

LUNDFIELD WELDING COMPANY 1445 W. 58th St. Cleveland, Ohio

Special Washers

We carry in stock Silicon killed Steel specially suited for case-hardening. Stock dies for producing washers from .0015 to ½" thick.

Thomas Smith Company 294 Grove St., Worcester, Mass

SPECIAL MACHINERY AND CONTRACT MACHINE WORK

Torrington service includes all essentials of machinery design and construction: specialized engineering and designing staff—pattern shop—forge shop—heat treating equipment—machine shop completely equipped—large assembly floor covered by cranes.

THE TORRINGTON MANUFACTURING CO., Torrington, Conn.

N. A. WOODWORTH CO.

Elmhurst 6220

Heat Treat and Plating Division
FERNDALE (DETROIT SUBURB) MICHIGAN

CONSIDER GOOD USED EQUIPMENT

IMMEDIATE AVAILABILITY AND DELIVERY ARE IMPORTANT FACTORS NUMEROUS OTHER MACHINES ALSO AVAILABLE

AIR COMPRESSORS

574 cu. ft. 14"x14" Chicago Pneumatic Single Stage B.D., 125 lbs. Pressure 1145 cu. ft. 26"x12"x14" Chicago Pneumatic Type O-CBR M.D. with 205 H.P. G.E. Motor. 100 Pressure
cu. ft. 15/30x27/16½x24 Worthington Engine
ive. 90 lbs. Pressure
cu. ft. 21/40x22½x36x30 Ingersoll-Rand, steam
iven. 180 lbs. Pressure

BORING MILLS-HORIZONTAL

1/2" Bar Southwark Double Head Horizontal Bor-ing Mill. Table 51%"x121", Motor Driven. Heads Motor Driven. Heads Motor Driven. Bar Barrett Heavy Duty Boring Machine, Arr. for M.D. Work Table 13"x6"1"

BRAKES-PRESS TYPE

8' Verson No. 508, V-Belt Motor Driven. Capacity 3/16"
62" Verson No. 1062, Motor Driven. Capacity No. 10 Gauge
50" Verson No. 2050, Motor Driven. Capacity No. 10 Gauge

BUILDINGS

75'x247' Steel Building, Mill Type 80'x400' Steel Building

BULLDOZERS

No. 7 Ajax, M.D. Face of Crosshead 12"x76", 16" Stroke
No. 3 Williams & White, Belt Driven, Face of Crosshead 7"x39". Stroke 16"
No. 5 Ajax Bulldozer, Belt Driven. Face of Crosshead 9"x54". Stroke 16"

CAPSTAN

No. 1 Caldwell Vertical Capstan Car Spotter, M.D.

| CRANES—OVERHEAD | ELECTRIC TRAVELING | 2 ton Shaw | 35" | Span | 220 Volt D.C. | 2 ton Shaw | 59"5% | Span | 220 Volt D.C. | 10 ton Alliance | 32"3% | Span | 220/3/60 A.C. | 10 ton Shaw | 61'7" | Span | 220/3/60 A.C. | Span 35' Span 220 Volt D.C.
59'5%' Span 220 Volt D.C.
16'9" Span 220 Volt D.C.
22'34' Span 220 Volt D.C.
61'7" Span 220 Volt D.C.
30'6" Span 220/3/60 A.C.
5-ton Auxiliary

CRANE BRIDGES

10 ton P&H 26' Span 10 ton P&H 39'11" Span 15 ton Allianee 42'6" Span 40 ton P&H Type 60' Span All complete with End Trucks

o ton McMyler Interstate Gantry Crane, 95' Span. Equipped with A.C. Motors

CRANE-MONORAIL

m Euclid Two Point Lift Type "G" Monorail ist. Two 220 volt 3 phase 60 cycle motors Hoist.

CRANE RUNWAY

571' Steel Outdoor Runway, "A" Frame Construction
1000' Steel Outdoor Runway, "A" Frame Construction

CUTTING OFF MACHINE
Murchey Model H Heavy Duty Type Cutting Off Murchey & Machine

DRILL

4' Morris Plain Radial Drill. 12" dia. column Q.C.G.

EXPANDING MACHINE
Williams & White Hydraulic Tube Expanding

FORGING MACHINES
%" to 6" Ajax, National, Acme, Steel Frame

FURNACES—ANNEALING
145 KW Continuous Electric Strip Annealing
Furnace. Capacity 600-1050 lbs. per hour. Heating Chamber 30"x15"x12'

GENERATORS

5 KW General Electric 250 Volt Generator. With direct connected 200 HP De La Versne

With direct connected 200 Hr be had been beingine 312 KVA Westinghouse 2300/3/60 Generator with direct connected Corliss Engine 18"x30" 400 KW Crocker-Wheeler 250 Volt Generator with direct connected to Meta Uniflow Auto. Steam Engine 26"x30" 1250 KVA General Electric Generator, 2300 Volt, 3 phase, 60 cycle with 1000 KW General Electric Turbine

3 phase, 60 cycle with 1000 kW Generator, 5000 Volt A.C. with 3000 KW Curtis Steam Turbine 4000 KW General Electric 4500/3/60 Generator with direct connected General Electric Steam Turbine

8000 LB. MORGAN STEAM FORGING HAMMER

Double Leg

No. 32 WILLIAMS & WHITE MULTIPLE PUNCH & SHEAR

MULTIPLE PUNCH & SHEAR
Motor Driven
Including 20 H.P. A.C. Motor
Punch Cap. 350 tons Pressure
Shear Cap. 10' of '½' Plate
101" Between Housing
8" Diameter Shaft
Shearing Attachments Available, Including Blades
for Converting this machine into a Gate Shear

2,000,000# Tinius Olsen
Horizontal Compression Testing Machine
Complete with Pump and Motor

232,000# Tinius Olsen Torsion Testing Machine Motor Driven Capacity for Testing Rounds up to 2½" dia.

IZOD Impact Testing Machine

HAMMERS — BOARD DROP — STEAM DROP — STEAM FORGING
800-8000 lb. Chambersburg, Billings & Spencer, Eric, Niles-Bement-Pond

HAMMER-NAZEL

No. 5N Nazel Hammer, Motor Driven. Capacity 6"x6"

LATHE

42"x28' Wickes Heavy Duty Screw Cutting Engine Lathe, M.D.

LEVELLERS—ROLLER
50" McKay Roller Leveller, 17 Rolls, 4%" dia.,
M.D.
75" Torrington Roller Leveller, 19 Rolls, 2" dia.,
Arr. for M.D.

LEVELLER-STRETCHER

0"x144" Hyde Park Stretcher Leveller Hydrauli-cally Operated. Complete with Pump and Motor

MILLING MACHINE—PLANER TYPE
42"x42"x16' Ingersoll Adj. Bail, Planer Type Milling Machine, B.D.

MILLING AND SHAVING MACHINE

iewion L-91 Milling and Shaving Machine, 1 vertical spindle, 4 horizontal spdis. Table Drive, Hyd. center feed. Width between hori-zontal cutters 21". Face of vertical spindle 10"

PIPE MACHINES

4" Landis. motor driven, complete with cutting off attachment and chamfering attachment S" Standard Engineering Company Pipe Threading and Cutting Machine, Arr. for M.D.

S" Easton, Cole and Burnham Pipe Threading Machine, Motor Driven

16" Williams Pipe Threading Machine, Motor Driven

d Two Head, Belted Motor Drive

PRESS-FORGING

ESS—FORGING

000 ton Farrel-Birmingham Forging Press, M.D.

Die space 23%"x47%" without overhang; 8"

stroke; from top of table to lowest position of
head 37%" with table at bottom of stroke;
19" diameter of crankshaft, 15" diameter main

PRESSES

bearing
RESSES—DOUBLE ACTING—TOGGLE
No. 162 Toledo 5" stroke of Blankholder, 8%"
stroke of plunger, 21"x21" bed area
No. 408-A Bilss Double Crank, Motor Driven.
Stroke of Plunger 15". Stroke of Blankholder
10". Bed Area 72"x50"
No. 14B Bilss Toggle Drawing Press, 28" Stroke
of Plunger, 18" Stroke of Blankholder, 53" Between Unrights

PRESS—SINGLE ACTING—STRAIGHT SIDE No. 10-C Bliss Double Crank. 96" Between Up rights. 6" Stroke

PRESSES-Hydraulic

1000 ton Southwark Four Column Press 31"x31"

Between Columns, 68" Stroke, Complete with Pump and Motor

3000 ton Southwark Forging Press, 3 Columns, 17" dia. 7" Between Columns, 15" Stroke 30" Daylight

PRESSES-MISCELLANEOUS

RESSES—MISCELLANEOUS

1 D-45 Ferracute Press. Horizontal Double end Screw type, 36" ram stroke

No. 6 Bliss Horizontal Reducing Press, Belt Drive, 3" Stroke

No. 60½ Bliss Reducing Press, 21" between uprights

No. 356 Toledo Rack & Pinion Press, stroke of ram 5" to 36", Bed area 22"x22"

ram 5" to 36", Bed area 22"x22"

PUNCHES—MULTIPLE

No. 3 Cincinnati, 48" Between Housings, Motor
Driven, Capacity 10, 7/16" holes through %"

No. 5 Hilles & Jones, Arranged for motor drive,
125" between housings. Capacity 48, %" holes
through %"

through 4"
Cleveland Multiple Punch. Motor Driven. 10' Between housings. Equipped to punch 29, %"

PUNCH & SHEAR COMBINATIONS

UNCH & SHEAR COMBINATIONS

No. 2 Hilles & Jones Double End Punch & Shear,
M.D. 25" Throat. Cap. to punch 1" thru 1",
shear 6"x1"

No. 12 Williams & White Combination Punch &
Shear, Motor Driven. 42" Throat. Now rigged
for 6" angles and multiple punching, rated
punching capacity 2½"x1½"

No. 13 Williams & White Double End Punch &
Shear, M.D., 29" Throat. Cap. punch 1¾" thru
1", shear 2½" rounds
No. 1 Long & Allstatter Single End Punch and
Shear. Belt Drive. 24" Throat. Capacity 2"
thru 1". Shear 2½" rounds
No. 14 Williams & White Single End Punch and
Shear, Motor Driven. 48" Throat. Capacity
Punch 1¼" thru 1". Equipped for gag punching
No. 3 Hilles & Jones Single End Punch Motor
Driven. 12" Throat. Capacity Punch 1½" thru
1¼". Equipped for gag punching
No. 3 Hilles & Jones Single End Punch. Motor
Driven. 12" Throat. Capacity Punch 1½" thru
1¼". Equipped for Multiple Punching

ROLL FORMING MACHINE

No. 25L6 Kane & Roach Cold Roll Forming Machine. Will form channels 1" to 6" width, 1\(\frac{1}{2}\)" depth, 12 Ga. Steel. Equipped with emulsion dye cooling system

ROLLING MILLS

OLLING MILLS
9"x18" Farrel Rod Rolling Mill, 3 High
10"x16" United E & F Co. Single Stand Two High
12"x15" Mackintosh Single Stand Two High
16"x10" Waterbury Four Stand 2 High
16"x20" Waterbury Farrel Single Stand Two High
18\pm'x22" Cold Strip Mill 2 Stand 2 High
18\pm'x22" Cold Strip Mill 2 Stand 2 High
18"x36" Farrel Birmincham Single Stand 2 High
24" Mackintosh Bar Mill, 2 Stands 3 High

ROLLS—TAPER FORGING
No. 1 Ajax Taper Forging Roll, B.D.
No. 2 Ajax Taper Forging Roll, M.D.
No. 3 Ajax Taper Forging Roll, B.D.

No. 3 Ryerson High Speed Friction Saw, M.D. Complete with combination hand and electric hydraulic feed, and 5 extra 52" Saw Blades

SHEARS—ANGLE
4x4x½" Long & Allstatter Double Angle Shear,
Arr. M.D.

SHEARS-BAR

Garrison Guillotine Type Bar Shear. Arr. Motor Drive. Capacity 15"x2%"

SHEAR—GATE

48" No. 9 Bertsch Gate Shear, Motor Driven.
Capacity 1" Plate SHEAR—ROTARY Newbold Rotary Shear, Arr. for M.D. Cap. 1/2" mild steel plates

SLITTER 60" Bliss Gang Slitter, No. 213-E Arr. for M.D. Cap. 7 cuts 214 ga. mild steel

Cap. 7 cuts \$14 ga. mild steel

STRAIGHTENERS
Shuster Shape Straightening Machine, M.D. Cap.

%" Hexagons
No. 3 Sutton Two Way Flat & Shape Straightener.
Arr. for M.D. Cap. 1 1/16"x11/16" or
1½"x13/16" Flats, etc.
No. 0 Kane & Roach 12 Roll Straightener. Arranged
for Motor Drive. Adaptable for straightening
rounds, squares, angles, flats, etc.

%" Shuster Straightening & Cut-off Machine.
Motor Driven. 14" Cut-off. Equipped with
Hyatt Roller Bearings. Complete with set of
tools for %" and 5/16" wire

TESTING MACHINES W. S. Tyler Compar

Company Sieve Shaker. Motor W. S. Tyler Company Sieve Shaker. Motor Driven 1000 lb. Riehle Briquette Testing Machine 200,000 lb. Riehle Vertical Screw Power Testing Machine. Motor Driven. Complete with at-tachments for compression and tensile testing

WELDING MACHINE 800 KVA "Swift" Slash Welder with two trans-

Manufacturing

RITTERBUSH & COMPANY, INC. NEW YORK CITY

Equipment

Confidential Certified Appraisals Liquidations-Bona Fide Auction Sales Arranged

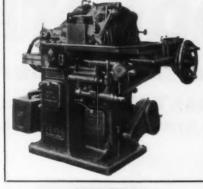
Consulting Engineering Service Surplus Mfg. Equipment Inventories Purchased

THE CLEARING HOUSE-

'DEEDS" not WORDS"

EVERY Item in STOCK
EVERY ITEM GUARANTEED

FALK Has It in Stock



GREENFIELD #12

Hydromatic Internal Grinder
Swings 15"—Grinds 5" Dia. 4" Deep.
Motor Driven-Hydraulic.

22 Landis Internal with X-Cell-O
Spindle

570 Heald Internal with Heads having 6" hole, Swings 20"

BORING MILLS

42" Colburn Vertical #32 Giddings & Lewis 31/8" Bar Horiz. #50 Giddings & Lewis 3" Bar Horiz. #50 Gisholt Knee Type Horiz. Motor Driven

SHAPERS

28" G&E Invincible
24" G&E High Duty
24" G&E High Duty
24" N.B.P. Planer-Shaper
25" Cincinnati Cone
26" Smith & Mills, Heavy
24" Stockbridge, Cone
20" Cincinnati, Cone

20" American, Cone 20" Ohio, Cone 18" Hendey, Friction 16" Stockbridge 16" Smith & Mills

14" Gould & Eberhart PRESSES \$93D Toledo Dble Cr. 4" Str Bed 54x36; Welded frame; 166 Consolidated Dble Crank 4" Stroke 42x36 Bed, Air Cushions; #75½ Bliss S.S. Geared, 5" Stroke; #301S Bliss Gang Die Press, 42" Roll feed. Perkins Dble Crank, Gap frame O.B.I. #211/2 Bliss Geared O.B.I. #4 Bliss Forging Press, Tapered Rolls. #75 Toledo Geared, Open Back. #75 Toledo Plain, Open Back. #4 Bliss—Back flywheel. Geared Motor Drive. 230 Bliss Arch Press. #25 Niagara Arch Press. #19-19C-20-20B Bliss O.B.I. #2-#3 Niagara O.B.I. #14 Stoll O.B.I.

#14 Stoff O.B.I.

#3 Consolidated O.B.I.

#3R—Marquette Geared, Back flywheel, Geared Motor Dr.

#702 Bliss Flat Trimming Press.

#5N—R&K American Can S.S. Tie
Rod, 3½" Stroke, Plain.

#6—Waterbury Plain Flywheel open
Back, 4500#.

#20 Waterbury dble acting Plain flywheel, Cam Press.

#25—Stoll Horn Press, 35 Ton Pressure. #24 Adriance Horn Press, 30 Ton

Pressure. ### Baxendale O.B.I. similar capacity 20 Blue

GRINDERS

14x50 Norton Pl.
12x36 Cincinnati Pl.
#2 Cincinnati Univ.
10x36 Landis, Plain.
14x48 B&S #14—Pl.
#1 Diamond Surface 12"x12"x24" M.D.
#2 OHIO Tool, Cutter, M.D.
#8 Gardner Disc, 40" BB
40" Covel-Hanchett Rotary



LATHES

10"x4' P&W Toolmakers 13x5 Mulliner QCG. 13x6 P&W. Model B— 14x6 Monarch 14x6 Rockford 14x6 American 14x8 Monarch QCG Collets. 16x6 L&S Geared Head 16x6 American Grd Hd. 16x6 American Cone 16x6 L&S. Cone 16x6 Greaves-Klusman 16x6 P&W. Cone. 16x8 Cincinnati 16x8 Cincinnati Taper. 17x8 Sidney 18x8 Davis— 18x8 Mueller 18x8 Hamilton Taper 18x8 Chard 19x8 LeBlond 20x8 American 20x10 Davis 24x12 Crawford-Erie 25x12 LeBlond

TURRET LATHES

26x16 Greaves-Klusman

28x12 Hamilton Plain 18x12 Prentice, Taper 18x10 Prentice QCG.

Libby 26x7½" Model C— W&S #2A Universal W&S #2A Univ. (High head) W&S #2A Univ. Bar feed



W&S #2 GFH. Turret Lathe Hand Cross Slide W&S #1 Turret Lathe with Hand Cross Slide W&S #3—Hand Screw, 1¼" Bar feed Acme #4—1½" Bar feed, GFH. P.F.T. Cross Slide J&L 2¼x¼" Bar feed J&L 2¼x¼" Chucking J&L 3x36 Chucking Gisholt 24" Univ. Chucking LeBlond 21" Turret on Carriage B&S #2 Wire feed, hand screw

> No. 4 BULLDÖZER Williams & White 18" Stroke

MILLERS

2-No. 31 DeVlieg SUPERMILS M.D.—Tables 16 x 66 IMMEDIATE DELIVERY

#4 LeBlond Pl. #1½ B&S. Pl.
#1½ Cincinnati Pl. #1—Kempsmith
#½ Van Norman #0 Van Norman
#12 B&S. Mfg. #4 Hendley Lincoln
#14 Gooley & Edlunde
#6 Jackson Vertical Miller and Die
Sinker
Index Vertical Millers (new) in stock
#4 Burke Bench, Pr. feed
#3 Burke Bench
#5 Stark Precision Bench on Stands—
arr. M.D.
#6 Whitney hand. #2 Steptoe hand.
#1 Garvin Plain
6x14 Pratt & Whitney Thread Miller

GEAR HOBBERS

No. 12 Barber Colman Rebuilt - Ready Motor Dr. Power Feed to Head

48" G&E Gear Cutter \$2 Whiton Spur \$1 Adams Hobber



THE CLEARING HOUSE

HIGH PRODUCTI

To satisfy your

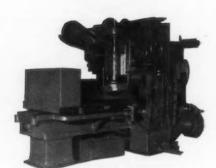
Illustrated here are but a few of the MANY MACHINES we changes or may be used as they are at present. The prices



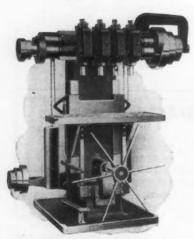
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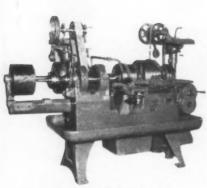
Norton Lapper



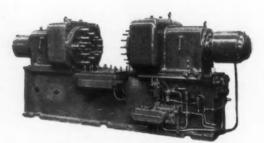
Springfield Grinder



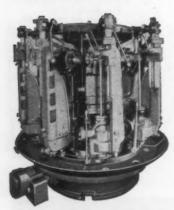
Moline 4-spindle Drill



Cleveland Automatic Screw Machine



Rockford Horizontal Duplex Drill and Tapper



Cleveland Spline Hobber



20-ton Oilgear Hydraulic Forcing Press



Lennox Rotary Bevel Shear

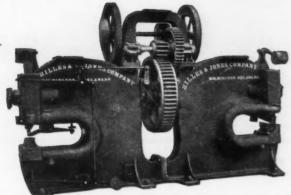
Complete descriptions and photos of these

LOUIS E.

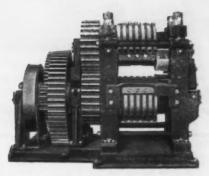
ON MACHINES...

immediate requirements

have that can be adapted to your needs with a few minor on these machines make them particularly interesting.



Hilles & Jones Double End Punch and Shear



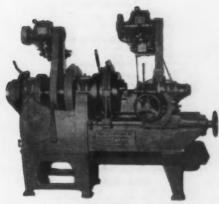
No. 1 Williams & White Forging Roll



Toledo Seamer



Foster Fastermatic Lathe



No. 23 Smalley-General Thread Mill



B-50 Unishear

CHICAGO, ILL.



42" Lamb & Nash Rotary Slitter



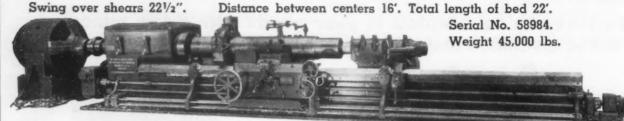
Yoder Flanger

and other machines are yours on request

EMERMAN & CO.

THE CLEARING HOUSE-EASTERN Rebuilt

22 AMERICAN 100 H. P. INPUT SUPER LATHE



Electrical equipment-100 H.P. main drive motor and 4 other motors. All motors 230 volt, direct current. 140 Spindle speeds from 33 to 1200 RPM. A super-powered, super-capacitied lathe, designed to

obtain the maximum metal cutting capacities of ce-

mented carbide cutting tools. Equipped with anti-friction bearings throughout, hardened and lapped helical gears in headstock, apron control, chip breaker, chip conveyor and many special features. Designed for extra heavy work, especially the turning of forgings.

AUTOMATICS
%-'h" Cleveland Model B, m.d. (2)
4 spindle %" Cleveland Model M, m.d. (2)
6 "Model A Cleveland, belt
114.-14" Cleveland Model B, belt
114.-14" Cleveland Model B, belt
124" Cleveland Model A, m.d.
6" Cleveland Model A, m.d.
0" Cleveland Model A, m.d.
No. 5A Potter & Johnston Automatics (7)
No. 6B Potter & Johnston Forbake drum work
Nos. 23, 24 New Britains, belt

ARBOR PRESSES

No. 24 Greenerd, m.d. 15 ton Lucas, belt No. 3 Famco, bench type

BOLT THREADING MACHINES

9/16" Landis 2 spindle, m.d.
2 spindle 1" Acme, belt
3 spindle 1" Acme, belt
1" Landis, belt
1½" Landis, belt
1½" Landis, belt, lead screw
2½" Acme, belt
American Bolt Heading Machine, belt, 1½" cap.
No. 148 Rickert & Shafer Automatic Threading, 1"

BORING MILLS
30" Colburn, 1 head, belt
48" Niles-Bement-Pond Car Wheel Borer, belt
51" Baush, m.d., 2 heads
7' Niles, 2 heads, friction feeds, old
No. 2 Barrett Cylinder Borer, 5" bar, belt
Niles-Bement-Pond Cylinder Borer, m.d., 12" main bar

BROACHING MACHINES

BROACHING MACHINES
Cincinnati Mill Broach, m.d., brand new
No. 2 J. N. LaPointe, m.d., gear box
No. 2 LaPointe of Hudson, belt
No. 3B J. N. LaPointe, gear box, m.d.
No. 3 J. N. LaPointe Double, belt

CENTERING MACHINES

Hendey Single End, 14½" swi Whiton Single End, 12" swing Phoenix Single End

BALL BEARING DRILLS-SINGLE SPINDLE

Allen No. 2, belt Henry & Wright Class B No. 2, belt Henry & Wright Class K, No. 2, belt Leland & Gifford No. 2, belt

BALL BEARING DRILLS, MULTIPLE SPINDLE

BALL BEARING DRILLS, MULTIPLE SPINDLE

spindle Edlund No. 3, m.d.

spindle Henry & Wright No. 2, belt

spindle Leland & Gifford No. 2, belt

spindle Textile Hortzontal, md.

spindle Avey, m.d.

spindle Cincinnati Pulley Machinery No. 2, belt

spindle Bellund No. 2, m.d.

spindle Bellund No. 2, m.d.

spindle Bellund No. 2, m.d.

spindle Henry & Wright Class K No. 2

spindle Henry & Wright Class K No. 2

spindle Henry & Wright Class B No. 2

spindle Henry & Wright Class B No. 2

spindle Henry & Wright Class B No. 2

spindle Henry & Wright Class K No. 2

spindle Henry & Wright Class K No. 2

spindle Henry & Wright Class K No. 2

spindle Henry & Wright Class B No. 2

spindle Kokomo No. 2

spindle Leland & Gifford No. 2 m.d.

MULTIPLE SPINDLE DRILLS

3 spindle 20° Barnes Gang
4 spindle No. 2 Colburn Mfg.
4 spindle No. 2 Focte-Burt
4 spindle No. 2 Focte-Burt Rail
4 spindle No. 2 Focte-Burt Rail
5 spindle 24" Barnes All Geared Self-Oiling
6 spindle 24" Barnes All Geared Self-Oiling
6 spindle National Acme Auto. Horizontal
6 spindle National Acme Auto. Horizontal
7 spindle Niles
Nos. 098, 188 Garvin Horizontal Duplex
No. 1 Pratt & Whitney 2 spindle Gun Barrel
Nos. 02, 3 Baush
No. 5 Fox
Nos. 30, 37 Nateo
No. 7D Moline 2 spindle Hole Hog
No. 15HC Fox
No. 18 Natco
No. 25 Baush Straight Line
No. 26C Fox Tapper
No. 51C Harrington
D31 Fox

RADIAL DRILLS

RADIAL DRILLS

RADIAL DRILLS
2''A 'Avey Sensitive
3' American Sensitive
3' Carlton Sensitive
3' Carlton Sensitive
3' Mueller Plain, gear box
4' Cincinnati Bickford Plain, U. S. Varidrive
4' Hammond Jack Knife, m.d.
4' Hammond Jack Knife, m.d.
4' Hammond Jack Knife wail Type
4', 5', 6' Niles-Bement-Pond Semi-Universal, var.
speed m.d.
4', 5', 6' Niles-Bement-Pond Semi-Universal, gear box
4' Ryerson Plain, gear box
4' Prentice Plain, cone
5' Dresse Plain, gear box
5' Prentice Plain, cone
6' Dresse Plain, gear box
7' Frosdick Plain, cone
No. 1 W. F. & John Barnes Horizontal

UPRIGHT DRILLS

UPRIGHT DRILLS

15". 22", 28" W. F. & John Barnes

20" Barnes All Geared Self-Oiling

20" Canedy-Otto, m.d.

20" Superior

21". 24", 32", 36" Aurora

21". 25" Weigel

22". 24" Barnes All Geared Self-Oiling

23" Snyder

24" Hoefer

24" Hoefer

24" Rockford

25" Superior

32". 36" Cincinnati Bickford

32". 36" Cincinnati Bickford

32". 40" Prentice

Nos. 2, 22 Colburn M.D.

D3 Minster H.D.

Nos. 314, 315 Baker Bros. H.D.

GEAR MACHINERY

GEAR MACHINERY

6". 18" Gleason Straight Bevel

16" Cincinnati Hobber

No. 1-26" Whiton Full Universal

No. 3-26", 3-36", 3 Heavy, 4-36", 4-48", 6-60",

8-72" Brown & Sharpe Spur Gear Cutters

No. 3-26" Cincinnati Spur Gear Cutter

No. 5A Lees-Bradner Gear Generator

No. 61 Fellows Gear Shaper

Gleason Bevel Gear Tester

Schuchardt & Schutte Gear Tooth Rounder

24" Cross Gear Tooth Rounder 20" Rochester Gear Tooth Rounder Gleason Spiral Bevel Gear Rougher

INTERNAL GRINDERS

No. 6 Bryant Chucking, belt No. 9 Cincinnati Internal, s.p.d. No. 12A Bryant, two motor drive No. 80 Heald, 2 motor drive No. 39 Heald Cylinder, hydraulic Nos. 55, 60, 65 Heald Cylinder

CYLINDRICAL GRINDERS

CYLINDRICAL GRINDERS

6x18" Cincinnati Plain Hydraulic, m.d.
6x32" Norton Plain, m.d.
10x18" No. 14 Brown & Sharpe, belt
10x18" No. 14 Brown & Sharpe, m.d.
10x24" Landis, m.d.
10x30" Queen City, m.d.
10x36" Norton, md. (6 in stock)
10x36" Norton, belt
10x52" Landis, m.d.
12x18" Cincinnati, m.d.
12x38" Cincinnati, m.d.
12x38" Cincinnati, m.d.
12x36" Modern, m.d.
12x36" Modern, m.d.
12x372" Cincinnati, 3 m.d., hydraulic
16x52" Landis, m.d.
18x72" Cincinnati Auto Parts Grinder, m.d.

DISC GRINDERS

No. 4 Besly, s.p.d.
No. 4 Gardner, s.p.d.
No. 6 Diamond, s.p.d.
No. 20 Gardner B.B. Combination Disc and Roll, m.d.
No. 120 Gardner Plain, s.p.d.
No. 120 Gardner Combination, s.p.d.

EMERY GRINDERS

30" Blount Wet, m.d.
Cadillac Polishing, m.d.
Hill-Curtis Polishing, belt
Hilsey-Wolf 5 H.P., m.d.
Safety Emery Wheel Co., belt
Mitchell Eng. Co. Type AI Polishing, m.d.
5 H.P. Northern, m.d.
Rockford Wet, belt
Springfled Wet, m.d.
U. S. Elec, Tool Co., m.d. Blount Wet.

CENTERLESS GRINDER Cincinnati Valve Seat Grinder, motor drive, 2 motors

SURFACE GRINDERS

SURFACE GRINDERS

No. 2 Fraser Lapper, belt

No. 3 Brown & Sharpe Planer Type Surface, belt
18x48" Diamond L.D. Face, m.d.
36"x84" Diamond H.D. Face, m.d.
54" Bridgeport Knife, belt
Covell-Hanchett Knife, m.d. No. 500 UK

TOOL & CUTTER GRINDERS

No. 1 Cincinnati, belt
No. 3 Brown & Sharpe, belt
No. 4, 5, 31 Oliver Motor Driven Drill Pointers
No. 23 Brown & Sharpe Gear Cutter Grinder, belt
Gisholt Universal, belt
Gleason Cutter, belt

1002 TENNESSEE AVE.

FAS

THE CLEARING HOUSE MACHINE TOOLS

Gould & Eberhardt Gear Cutter, belt Landis Chaser, belt Yankee Drill, belt

UNIVERSAL GRINDERS 12x48" Modera, belt No. 4 Brown & Sharpe, belt

Pettengell Bumping, belt
60 lb. Bradley Rubber Cushioned Helve, belt
80 lb. Bradley Rubber Cushioned Helve, belt
100 lb. Little Glant, belt
100 lb. Little Glant, m.d.
200 lb. Bradley Upright Strap, belt
250 lb. Little Glant, belt
350 lb. Niles Steam, new (3)
350 lb. Niles Steam, new (3)
150 lb. Maerican Eng. Wks. Steam
1500 lb. Morgan Single Frame Steam
1500 lb. Morgan Single Frame Steam
2000 lb. Eric Double Frame Steam
2000 lb. Niles-Bement-Pond Single Frame Steam

KEYSEATERS

GEARED HEAD ENGINE LATHES

16"x 7' Cisco, m.d. 30"x14' Hendey, m.d., taper 22"x16' centers (22' bed) American 100 H.P. Super 22"x10" centers (12" bed) American 100 H.P. Sul Lathe 24"x18" Lodge & Shipley Patent Head, m.d., taper 26"x16" Bridgeford, m.d., taper 26"x16" Bridgeford, m.d., taper 27"x21'9" Bridgeford, m.d., taper 27"x21'9" Bridgeford, m.d., taper

CONE HEAD ENG

11"x 5' South Bend

13"x 6' Willard

14"x 6' American

14"x 6' Merican

14"x 6' Willard

16"x 6' Bradford

16"x 6' Bradford

16"x 6' Bradford

16"x 8' Bradford

16"x 8' Roaders Klusman

16"x10' Bradford

18"x 8' Mueller, taper

18"x 8' Mueller, taper

18"x 10' Bradford

18" x10' Springfield

18"x12' Bradford

18"x12' Springfield

18"x12' Monarch

18"x12' Monarch

18"x12' LeBlond, taper

19"x 8' LeBlond, taper

19"x 8' LeBlond, taper

19"x 8' LeBlond, taper

19"x12' LeBlond, taper

19"x12' LeBlond, taper

20"x10' Lodge & Shipley

20"x10' Lodge & Shipley

20"x10' Lodge & Shipley

20"x10' Lodge & Shipley

20"x10' LeBlond, taper

21"x12' Bradford

21"x16' LeBlond, taper

21"x18' Niles, taper

24"x10' Canada

24"x10' Canada CONE HEAD ENGINE LATHES 22"x12' Greaves-Klushian 22"x13' Niles 22"x18' Niles, taper 24"x10' Bridgeford 24"x10' Carada 24"x10' LeBlond 24"x10' Whitomb-Blaisdell, taper 24"x11" Whiteomb-Blaisdell, tape 24"x11" Chard 24-48"x14" McCabe 2 in 1 24"x16" Schumacher-Bove 26"x18" Schumacher-Boye, taper 30"x14" Harilton, taper 30"x16" Schumacher-Boye, taper 30"x20" Schumacher-Boye, taper

MANUFACTURING LATHES MANUFACTURING LAIMES
3x80" LoSwinz, m.d.
8x36" LoSwinz, m.d.
8x60" LoSwinz, m.d., hardened ways (2)
8x60" LoSwing, m.d., hardened ways, 2 carriages
12"x5' Sebastian, m.d.
16"x6" Rockford, cone
18"x8' Chard, cone
20"x8' American Turret, cone
20"x8' American Turret, cone
20" raised to 28"x10' American Plain Turning, cone
30" American Pulley Turning, cone
11"x4' Wells Speed Lathe, cone
15"x6' Automatic Threading, cone Niles-Bement-Pond Axle, cone No. 5-42396" Niles-Bement-Pond Center Driving Car Wheel Lathe, m.d., brand new Niles-Bement-Pond Quartering Machine, m.d., new

MILLING MACHINES

MILLING MACHINES

No. 0 Steptoe Plain, cone
No. 25 Becker Plain, cone
No. 2 Prat's & Whitney Hand, cone
Curter & Hakes Mig., belt
No. 3 Garvin-Lincoln Type, belt
Gooley & Edlund Briggs Type A, belt
Putnam Briggs Type, belt
Newton C17 Vertical Slab, m.d.
11"x4" Hanson-Whitney, m.d.
30"x28"x8" Ingersoll Planer Type, m.d.
40" Ohio Tilted Rotary, m.d.
48" Oesterlein Tilted Offset, m.d.
C66A Newton 3 spindle Continuous, s.p.d.

MILLING MACHINE ATTACHMENTS WILLING MACHINE ATTACHMENTS

Vertical Attachment for No. 3 Cincinnati, cone

Vertical Attach, for Milwaukee Mfg. Type

Vertical Attach, for No. 1½ Cincinnati cone

Porter-Cable Vertical Attach, for No. 2 Cincinnati cone

Porter-Cable Vertical Attach,

12½" Brown & Sharpe Plain Dividing Head

No. 6 Brown & Sharpe Triple Index Centers

12" Cincinnati Gear Cutting Attach,

16" Cincinnati Gear Cutting Attach,

Slotting attachment for No. 2b Milwaukee

Universal attachment for No. 2A Brown & Sharpe

1½" Cincinnati Rack Milling Attach, for No. 3 dial

type type Kearney & Trecker Attachment for milling bridge

reamers
Cincinanti Spiral Milling Attach, for No. 3 cone type
Kearney & Trecker Universal Attach, for No. 3B
Slotting Attach, for No. 3 Cincinnati, H.P.
Slotting Attach, for No. 2 Cincinnati cone
Universal Attach, for No. 3B Milwaukee

PIPE MACHINES

2" Landis Double Head Pipe & Nipple, cone
Red-E-Haul Portable, m.d., 2"

2" Rignall & Keeler, m.d.

2" Mo. 70 Jarecki, m.d.

2" Merrell, m.d.

4" Einall & Keeler, m.d.

4" Eaton, Cole & Burnbam, cone

8" Landis, m.d. (2 in stock)

PLANERS

24"x24"x12' Chandler. 2 herds, belt
36"x36"x10' Cincinnati. 3 heads, belt
36"x36"x10' Whitcomb-Blaisdell. 2 heads, belt
36"x36"x13' Niles-Bement-Pond, 1 rall, 1 side head belt 42"x42"x12' Niles-Bement-Pond, 2 heads, m.d., box table 42"x42"x18' Cincinnati, 2 heads, m.d.

42"x42"x18' Cincinnati, 2 heads, m.d.

PRESSES

McDonald Single Crank, 4" stroke
Waterbury-Farrel S.C. O.B. 1%" stroke, weight 600 lbs.
Waterbury-Farrel D.C. O.B. 1%" stroke, wt. 1700 lbs.
No. 28 Consolidated O.B.I.
C2 Ferracute O.B.I.
D2 Ferracute Single Action Drawing
D12 Ferracute Single Action Drawing
P2 Ferracute Stiles Type
No. 6 Waterbury-Farrel D.C.
S51 Ferracute B.C.
D653 Ferracute Redrawing
No. 2684% Toledo D.C. Toggle Drawing, 29" stroke, weight 175,000 lbs.
No. 496D Toledo D.C. Toggle Drawing, 17" stroke, weight 160,000 lbs.
30 ton Lourie Hydraulic
B33 Metalwood Hydro Pneumatic
No. 0 Springfield Straightening

PUNCHES & SHEARS
Buffalo Armor Plate Slitting size 101Wx20
Cleveland Model EF S.E.
No. 6 Long & Allstatter D.E.
No. 6 Long & Allstatter S.E.

RIVETERS
Nos. 2A, 2A H.D., 3A High Speed Hammer Co.
1/4 Shuster 14" Shuster
Hanna Air Riveter, 13" throat
Chiego Pneumatic 10x25x97
Hanna Bench Type Air, 8" throat

No. 2B Cochran-Bly Cold Saw No. 4 Cochran-Bly Cold Saw

No. 4B Cochran-Bly Cold Saw 6" Avey Milband Cutting-off Saw 8x6" Peerless Hack Saw, m.d. 8x6" Racine Hack Saw 10x10" Kelley Hack Saw, m.d., new (5 in stock) 8x8" Atkins Kwik-Kut Hack Saw, m.d. 8" Newbon Cold Saw Burr Cold Saw 20" Burke Cold Saw . 11

TURRET LATHES AND SCREW MACHINES TURRET LATHES AND SCREW MACHINES

No. 0 Brown & Sharpe Hand, cone

No. 4 Bradons & Oliver, cone

No. 4 Foster, cone

No. 6 Brown & Sharpe, cone

2¼ "Arme Flat Turret, cone

2¼ "Xy" Jones & Lamson Steel Head Flat Turret,

m.d. bar

2¼ "Xy" Jones & Lamson, bar feed, m.d., geared

haad (4)

3x36" Jones & Lamson Geared Head, chucking (4)

3x36" Jones & Lamson Geared Head, bar

3x36" Jones & Lamson 2 spindle Geared Head, chuck
ing (6)

3½x40" Greenlee Flat Turret, cone, bar

18" Acme Turret, cone

12" Gisholt Model I Tilted Turret (3)

24" Gisholt Model I Tilted Turret (3)

26" Libby Type C Turret Geared Head, m.d.

SHAPERS 16" Hendey Friction Type 24" Queen City Back Geared, cone 24" Smith & Mills Friction Type

CIRCLE SHEARS

Niagara 13" throat, belt. 18 ga.
Southwark Rotary. 36" throat, %" cap. m.d.
No. 2 Southwark Rotary. 30" throat, %" cap., m.d.
No. 34 Lennox Rotary Bevel, %" cap., belt
No. 258 2x14 Quickwork Rotary, 30" throat, %" cap.,
m.d.
Quickwork Circle. 30" broat, 16 ga.
Quickwork 20" throat, 18 ga., belt

SHEET METAL MACHINERY
7' Crat Yron Hand Brake, 18 ga.
McCabe Pneumatic Flanger, 18 ga.
McCabe Pneumatic Flanger, 18 ga.
10' Niles-Bement-Pond Flanger, 18 ga.
10' Niles-Bement-Pond Flanger, 18 ga.
No. 1 Campbell Nibbler, 6" throat, 3/16" cap.
No. 2 Campbell Nibbler, 12" throat, 4" cap.
No. 10A Quickwork Seamer, 20" throat, new
Magee Sheet Metal Wiring & Edging Machine, m.d.

SLOTTERS

TAPPING MACHINES No. 1 Garvin Knee Type, belt Nos. 2, 2X Garvin Automatic Gatermen Oscillating Pneumatic, %" cap. (3) ½" Rickert & Shaffer Vertical (2) No. 5 Webster & Perks 5 spindle Vertical Nub. belt 6 spindle 1" Acme Semi-Auto. Nut, belt

WELDERS 200 ampere Lincoln Stable Are 300 ampere General Electric 300 ampere Lincoln Stable Arc Hobart Bros. 300 amp., gasoline engine drive

MISCELLANEOUS
Norton Running Balance Indicating Machine, m.d., 46" Cap.
No. 5 Williams & White Bulldozer, belt
16" Heald Rotary Magnetic Chuck
Matson Cut-off Machine, s.p.d.
Walker Demagnetizer
Sprague Elec. Wks. Dynamometer, 250 H.P., 1506
RPM, 570 amp. 250 volts, complete with control

Our new building addition has now been completed, giving us a total floor area of 115,000 square feet. FURTHER ASSURANCE OF SPEEDY DELIVERY ON BETTER REBUILT MACHINE TOOLS and EQUIPMENT. All machines listed here are in our stock. If you don't find what you need listed, write or wire us anyway, and we'll try to get the unit for you.

CHINER CINCINNATI, OHIO

THE CLEARING HOUSE

MODERNIZE YOUR OLD HEAVY DUTY MACHINE TOOLS

Heavy Duty Planers and Planer Type Millers; Horizontal and Vertical Boring Mills; Engine Lathes; Milling Machines; and similar Machine Tools, no matter how old, can be rebuilt and modernized and made suitable for today's task.



Interior view of our new Newark, New Jersey, plant NOW READY TO GO TO WORK, which in addition to our plant in Long Island City enables us to handle the rebuilding of large machine tools with vastly increased facilities and speed.

Each machine after rebuilding will be submitted for inspection under power and guaranteed for all practical purposes to perform equal to new.

DON'T RETIRE YOUR OLD MACHINES - ATLANTIC CAN REBUILD THEM

ATLANTIC MACHINERY CORPORATION

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538-THE IRON AGE, January 1, 1942

EFFICIENT AND ACCURATE

Butterfly Filing and Sawing Machine

[Die Making Machine]

Made in Three Sizes

Price MODEL D

\$120.00 Net

Including Motor



Price MODEL EL

\$145.00 Net

Including Motor

MODEL No. 16 Special

\$225.00 Net

Including Motor

Saves 50% or more in cost of sawing, filing and lapping on dies, gauges, tools, etc.

Surface Table On Model D - - - 10" x 16"

Model El - - - 12" x 12"

Model No. 16 - - 16" x 16"

PROMPT DELIVERY

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Victor Machinery Exchange, Inc.

251 CENTER STREET

NEW YORK, N. Y.

AUTOMATICS

1-3/4" cap. Acme 4 spd. M.D. 1-4 spd. Gridley 11/4" cap. M.D.

BORING MILLS—Vertical

48" Niles Bement & Pond Car Weel Borer.

BORING MILLS—Horizontal

31/2" bar D & H Floor type M.D.

DRILLS

1-5' Niles Bement & Pond gear box S.P.D. 3½' Bickford un. 2 & 4 spd. Henry & Wright 24" Barnes camel back M.D. 4—22" Barnes P.F. M.D. 36" Cincinnati Bickford Sld. hd. 36" Aurora Sl. Hd. 36" Superior Sld. Hd. 4 spd. Barnes No. 4 Taper 82" x 17" tbl. p.f. to spd. M.D. 16 spd. Bosch, M.D. Oil grooved 54" x 30" rect. head No. 3

Morse Taper. 2 X Garvin Automatic Tapper 4—Langelier Bench High Speed 1—Demco S.S. High speed

FORGING HAMMERS

3-3000 Alliance, Steam drop forge. 2-2000 Morgan, Steam drop forge. 1-1500 Morgan, Steam drop forge. 1-1000 Morgan, Steam drop forge.

GEAR MACHINERY

Whitten automatic Gear Cutter spur and bevel 1-3-26" B & S Auto, Gear Cutter

GRINDERS

1—14 x 50 Lea. Mt. Dr. 3 mts. Un. 1—No. 1 Wilmarth and Marmon Un. T & C 10 x 48 No. 14 Brown and Sharpe Pl. 8 x 36 Fitchburg Pl. 3—No. 3 Brown and Sharpe T & C 12 x 36 Landis Un.

LATHES 2—12 x 5 Cleveland G. Hd. Taper Attch. 14 x 8 American C.P.D. 10 x 8 Flather M.D. 17 x 8 South Bend C.P.D. 14 x 6 LeBlond. 3 stepcone D.B.G. 10 x 10 South Bend C.P.D. 2-18 x 18 Mueller, 3 stepcone D.B.G. 2-18 x 8 Morris, 3 stepcone D.B.G. 24 x 12 Shoemaker and Boye D.B.G. 32 x 20 New Haven 50 x 24 Fifield Triple Geared 4 x 60 Fitchburg low swing-new cond. 42 x 26 Bement Triple geared 18 x 10 Monarch 3 stepcone D.B.G. 12 x 5 Hendey Yoke hd. Taper Attch.

PLANERS

30 x 30 x 8' New Haven

TURRET LATHES

No. 1 Bardons and Oliver No. 2 Warner and Swasey 4" Conradson Un. No. 6 Brown and Sharpe

MILLERS

2-Producto-Matic Milling Mchs. No. 3 Cincinnati, Pl. No. 1 B Milwaukee double arm rack cutting attachment and vertical attachment. No. 0 Van Norman hand. Hendey and Becker Lincoln Type AB Becker Vert. Rotary Table, New Condition 1—No. 3½ Fox Plain No. 3 Lees Bradner Thread Miller Holden Morgan Thread No. 2 A Brown and Sharpe Vert. Hd.

PRESSES

Bliss Incl. mt. dr. 2-No. 2 Standard O.B.I. 2-No. 18 Bliss O.B.I. 2-191/2 Bliss O.B.I. 43/4 Michigan O.B.I. Ferracute Bench O.B.I. Toledo Arch G.M.D. #51. No. 37 Niagara back Flywheel M.D. No. 5 Stiles and Parker geared No. CG 14 Ferracute O.B.I. Automatic roll Fd.

No. 255 D & K 72"-16 ga. Mt. dr. 10' x 10 gauge George Ohl Mt. dr. 6' x 10 ga. D & K Leaf Type Mt. dr.

50 K.W. Thompson Spot Auto. 60 cycle

20" Steptoe C.P.D. 26" Kelly M.D. 24" Milwaukee C.P.D.

WELDERS

35 K.W. Thompson Spot Auto. 60 cycle 25 K.V.A. Thompson 25 cycle (three) 58 K.V.A. Thompson 25 cycle 20 K.W. Toledo 40 cycle 35 K.W. Thompson 25 cycle 25 K.W. Federal Butt Welder 25 cycle 45 K.W. Federal Butt Welder 25 cycle 8-200 AMP. Lincoln stable Arc Welders 25 cycle 1-G.E. 200 AMP. Arc Welder 25 cycle 1-150 AMP. Lincoln Shield Arc Welder 25 cycle

PIPE MACHINES

10" Cox 023 A Oster 6" cap. 10" Bignall & Keeler M.D. 6" Stover M.D. Acme & Landis Bolt Thrd. Machs.

SAWS

3" Burr Cold No. 12 Higley Cold No. 3 Klemm Metal Band

MISCELLANEOUS

3-Grant Spinners 3A High Speed Hammer Morton Keyseater 4" capacity No. 0-2-3 LaPointe Broaches 1-No. 1 Grav Nibbler Tur. Type 6" Pilton Slotter 7" Rhodes M.D. Wells Wire Straightener and Cut off

WOODWORKING MACHINERY

3 Drum Columbia Sander Defiance single spdl. Boring Machine Mt. on spd. Faye and Egan S. end Tenoner 6-Swing Cut-off saws 1-Automatic Glue Jointer 1-24" Oliver Jointer 1-No. 1 American Saw table 1-Smith Treadle Dado Saw table 1-New Britain Chain Mortising Machine 1-Friction feed Cut-off saw 1-Double end Cut-off saw 2-No. 21/2 American Dbbl. Spdl. Shapers Pettingill Saw Tenoning Machine

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110 East Pratt Street

Baltimore. Maryland

We pledge ourselves to continue the policy of high grade rebuilding upon which we have built an enviable reputation

I" Cleveland Model J double end threading, turning or drilling.
2" Cleveland Model A. Nos. 24, 33 & 34 New Britain chucking.
No. 6A Potter & Johnston.
14" Fay automatic.
No. 16 Gishelt Simplimatics. d threading, pointing,

AIR COMPRESSORS

136', 8"x8" Chicago Pneumatic Tool Co., type NSB, 136', 8"x8" Ingersoli-Rand, type ERI, 355', 12"x10" Ingersoli-Rand, type ERI, 357', 12"x10" Bury, class HL, 550', National, 3-cyllinder vertical, 620', 14"x8%4"x10' Sullivan, class WJ3, angle company of the co

pound, 2 stage, specifican, class WJ3, angle compound, 2 stage, specificans motor. 706°, 17"x99,"12" Suffivan, class WJ3 angle. 868°, 17"x16"x12" Chicage Pneumatic Tool Co., type OCB, 2 stage.

BROACHES

BROACHES
No. 1 LaPointe, screw type.
No. 2 Standard screw type broaching press, 12" stroke.
No. 3 Uilgear to daulic, motor drive.
Nos. 3 & 4 LaPointe of Hudson, screw type.
No. 3 J. N. LaPointe double screw type.
No. 3 American high speed, rack type.

DRILLS, RADIAL

3' Cincinnati.
4' Hammond sensitive, elbow arm. Tappet.
4' American.
3'y', 5' & 7' Western.
6' American, 14" column.

GEAR MACHINERY

GEAR MACHINERY

SA Cincinnati gear cutter.

No. 18H Gould & Eberhardt universal gear hobber.
12"x13" No. 12H Gould & Eberhardt Mfg. hobber.
12"x10" No. 12 Barber Colman hobbers.
24" No. 3 Adams Farwell gear hobber.
14"x8" No. 5 Bream regulation hobber.
14"x8" No. 5 Lees Bradner production hobber.
14"x8" No. 5 Lees Bradner universal hobbers.
26"x8" No. 3 Bream & Sharpe auto. spur.
36"x6" Gould & Eberhardt spur gear cutter.
36"x6" No. 4 Brown & Sharpe automatic spur.
National Tool Co. (Cleveland) Model B gear and gear shaper cutter checking machine.
Lipe gear tooth chamfering machine, double spindle.

GRINDERS, CYLINDRICAL, PLAIN AND UNIVERSAL

UNIVERSAI
6"x32" Norton.
10"x20" Bath No. 1 universal.
10"x36" Landis.
10"x36" Bath No. 2½ universal.
10"x56" Norton.
10"x50" Norton.
10"x52" Landis.
12"x36" Landis.
12"x36" Landis.
12"x37" Landis.
16"x42" Landis universal. Bath No. 1 universal. Landis. Bath No. 21/2 universal.

GRINDERS, SURFACE, TOOL & CUTTER

surface.

No. 3 Barber Colman hob grinder.

No. 3 Barber Colman hob grinder.

No. 3 Barber Colman hob grinder.

Selters & Gisholt tool grinders.

24" lagersell tub type face milling cutter grinder.

2½" Wilmarth & Morman drill grinder, belt drive.

2½" No. 5 Oliver drill grinder.

Oliver drill point thinner.

GRINDERS, MISCELLANEOUS

No. 2 Heim centerless, 5"x7" Pratt & Whitney worm or thread grinder, cam 5"xx" Pratt & Whitney worm or thread grinder, cam feed type.
Pratt & Whitney worm grinder, screw feed or leader.
Hutte honing machine, type MD 583.
No. 72A3 Heald internal.
No. 60 Heald thernal.
No. 60 Heald hydraulic cylinder.
Type 15 Norton vertical lapping machines.
No. 375 Hawes continuous rod and tube polisher.
10"x50" Norton cam shaft grinder.
17"x56"-48" Norton, Type B, Model 84 hydrauliccrankoin grinder.

crankpin grinder.

30"x 4" No. 4! Ransom double end, motor on spindle.

30"x84" Diamond face and edge, motor drive.

LATHES, ENGINE

All have quick change gears unless otherwise noted.

14"x 8' LeBlond.

14"x 8' Lodge & Shipley. natent head.

14"x 8' d. 16"x10' & 18"x8' Monarch.

16"x 8' American.

18"x 6' Rahn Larmon.

18"x 8' Waticoft.

18"x 8' American.

19"x 8' Slidney.

20"x10' American.

20"x10" Davis, double back geared.
24"x10" Sehumacher & Boye, J. 15.G. & T.A.
24"x10" LeBlond heavy duty, D.B.G. & T.A.
24"x10'/2" New Haven, standard change gear.
24"x12" Lodge & Shujley patent head.
24"x14" Sehumacher Boye.
24"x14" Sehumacher Boye.
24"x16" Schumacher Boye.
36"-43"x18" New Haven, 23" bed extension.
36"-43"x18" New Haven, 23" bed extension.

LATHES, TURRET

Most of these can be supplied either with bar feed and automatic chuck or arranged for chucking work. No. 3A Warner & Swasey.

14" Warner & Swasey.

12" (17" swing), No. 3 Gisholt.

112" (17" swing), No. 4 Foster, power cross feed.

214" x20" Acme.

174" swing No. 4 Cincinnati Acme.

21" Gisholt.

21" Gisholt.

21" Gisholt.

21" Swing No. & Lamson, cross feeding headstock.

3" x36" (14½" swing) Jenos & Lamson, cross feeding headstock. ing headstock. 24" Steinle, geared head.

LATHES, PRODUCTION

LATHES, PRODUCTION

9"x14" Porter cable,
9"x24" Sundstrand,
13"x 4' LeBlond geared head,
13"x 6' Automatic threading lathes, geared head,
16"x 5' Monareh Mfg, or rapid production,
16"x10' LeBlond rapid production,
18"x 7"-6" Wickes geared head, rapid production,
20"x8' Wickes 12 speed selective geared head Rapid
Prod. Prod. 24 No. 44
MILLS, VERTICAL BORING

MILLS, VERTICAL BORING

34" Colburn.

36" Niles car wheel boring.

60" Bullard. 2 swivel heads, power rapid traverse, motor drive.

motor drive.

2" Celburn. 2 swivel heads, motor drive, power rapid traverse.

MILLING MACHINES No. 24 Owen, universal.
No. 14A Garvin, plain. Range 28"x8"x19", plain.
No. 34 Ohio (Oesterlein) plain. Range 34"x12"x19".
No. 3 Van Norman duplex.

MILLING MACHINES, VERTICAL

MILLING MACHINES, value
No. 6 Berker, 18"x61" table.
Model AB Becker, 104"x324" table.
No. 3 Berker, 104"x323" table.
No. 3 Berker, 104"x323" table.
Model C Becker, 204" rotary table.
Nos. 1 & 1½ Knight.
No. 5 Brown & Sharpe, 16"x52" table.
12"x12"x24". Has 20" dia, power feed rotary table.

MILLERS, PRODUCTION AND

MISCELLANEOUS
Sundstrand Rigidmill with rotary table.

12" Cincinnati plain and BG Mfg. millers.
48" Newton. 2 spindle continuous rotary.
60" Ingersell, 3 spindle, continuous rotary.
No. 45 Bilton Productomatic.
Nos. 3, 38 & 6 Lees Bradner thread miller.
No. 33 Kempsmith Mfg.
Nos. 1 & IA Davis & Thempson drum type continuous

PLANERS

24"x24"x24" Cineinnati, crank type, one rail head.

24"x24"x 5' & 6' Gray, 1 rail head.

24"x24"x 6' Woodward & Powell, 1 rail head.

26"x26"x 8' American, 1 rail head.

30"x30"x10' Cineinnati, one (or two) rail heads.

32"x32"x12" Niles, 1 rail and 1 side head.

36"x36"x16" Woodward & Powell.

56"x56"x16' Gray, 2 rail and 2 side heads.

PRESSES

PRESSES

No. 21½ Bliss OBI, geared. 2¾" stroke, 6700 lbs.

71 ton Waterbury Farrel OBI, 4" stroke. 8300 lbs.

No. 62 Bliss openback non-inclinable, 8" stroke.

No. 76 Telede, O. B. non-inclinable, geared.

40 ten No. 5, series A Waterbury Farrel openback non-inclinable, 1½" stroke, 3700 lbs.

28". No. 71 Swaine double crank. 3" crank, 1" stroke, 24" Leffler double crank, geared, 5" stroke, 88 ton.

No. 4 Massillon S. S. geared. 5" stroke, 9630 lbs.

No. 65 Bliss Consolidated. S. S. geared. 3" stroke.

No. 7 Reckford S. S. geared. 3%" stroke.

No. 7 Reckford S. S. geared. 3%" stroke.

No. 8-7 Zeh & Hahnemann S. S. geared. 2%" stroke.

No. 53 Toledo, S. S. 3" & 4" stroke.

No. 575 Toledo S. S. tiered frame, eccentric shaft 6" & 10%" dia. 4½" stroke. 21,320 lbs.

No. 30E Cleveland S.S., double geared, twin drive, 14" stroke, 1300 ton capacity, 235,000 lbs. 750 ton Baidwin Southwark triple action hydraulically operated toggle drawing press. Between uprights 11'-10'/2", shut height 84", strokes 37", 26" and 12". Weight 500,000 lbs. No. 796'/4D Toledo 103" double crank, boggle drawing. No. 180 Toledo, 60" x60" single crank, double geared toggle drawing, approx. weight 189,500 lbs. No. CAI4 Ferracute horning. Adjustable bed. No. P2 Ferracute, punching, 1" stroke, 2500 lbs.

PUNCHES

Williams & White combination shear for bars, angles, channels, beams, tees with notcher.

6" throat '8" %6" Hendley & Whittemere No. 54, punch, rod cutter and shear, with angle shear attach. 12" throat, 1½" xi Long & Alistatter No. 1½s, architectural jaw.

12" throat, 1½" xi" Cleveland horizontal, arch jaw. 25" throat, ¾" x¾" Cleveland, architectural jaw.

26" throat, ¾" x¾" Rock River, architectural jaw.

SAWS, METAL

Nos. 12, 12B & 14 Higley cold saw.
8"x16" Kalamazoo metal band (new).
6"x 6" Tolede hack saw (new).
6"x 6" No. 14 Atkins Kwik-Kut hack saw.
8"x 8" Racine hack saw.
8"x 18" No. 6 Rebertson hack saw.
No. 2 Grabo metal saw table.
No. 17 Racine abrasive cut-off machine, 2\%" capacity.
Reed Prentice "Precision" band sawing machine for internal and external work.

SHAPERS

TRADES

7 Rhodes.
15" American.
16" Walcott.
20" Smith & Mills.
20" Obio.
24" Gould & Eberhardt.
24" Clincinnati.
24" Rockford.
24"x24"x24" Cincinnati crank shaper planer.
32" & 36" Morton draw cut.

SHEET METAL AND WIRE MACHINERY 4'x3'/16" Cinelinati press brake. 72'x14 ga. Stameo squaring, motor drive. No. 1A Ajaz taper forging roll. Yoder fender roll. 4'x3' & 3' Shuster wire straightener and cutters.

12" Dill adjustable head. Motor

THREADERS (BOLT CUTTERS)

1/2" Acme 2-spindle.
1/2" Webster & Perks 2-spindle.
1/2" Webster & Perks 2-spindle.
1/2" Landis, 1- & 2-spindle.
2" Landis two spindle pipe and nipple threader.
2" Acme.
1/2" & 2/2" Landis 2 spindle with lead screws.
1" & 2½" Landis 2.

UPSETTERS AND HEADERS

UPSETTERS AND HEADERS

1½" Ajax steel frame, continuous motion.
1½" Acme steel frame stop motion.
1½" No. 6 American Machinery Co., stop motion.
2" National steel frame, suspended slides, overhung guide on ram. Vee belt motor drive, stop motion.
2½" Ajax steel frame, suspended slide, stop motion.
twin drive gears, stop motion, original model, single geared. single geared.

4" Alax steel frame, suspended slide, twin geared, stop motion.

WELDERS

WELDERS

WELDERS

17 KVA American Electric Fusion, BW 16. spot.
17 KVA Thomson Gibb, type D 18-17, 440 V., spot.
18 KVA American Electric Fusion, No. MD30, spot.
20 KVA Agnew, type 10D, 440 V., spot. 16" reach.
20 KVA Taylor, 440 V., spot. 14" reach.
20 KW Taylor Meesta, 440 V., portable gun type.
20 KW National spot, 28" reach, 220 Volt.
23 KVA Winfield, type S 18 M-SH, 440 V., spot.
25 KW Winfield, type B8, 220 V., butt.
35 KW Federal, type 60, 440 V., butt.
35 KW Federal, type 61, 440 V., butt.
75 KVA Federal, type 61, 440 V., butt.
150 KVA Swift flash butt.
150 KVA American Electric Fusion, type HJ 10, 440 volt, air operated multiple welder.

Ask for Complete List No. 173

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Iron and Iteel Icrap Relaying Rails Cars Car Parts Locomotives Irack and Car Dismantling

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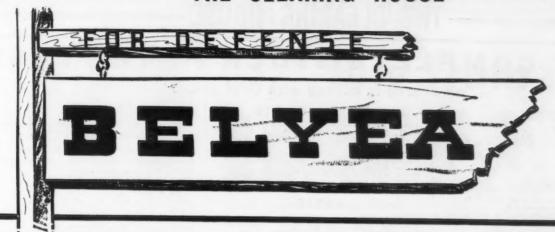
PLANTS AT

EAST CHICAGO, IND. ST. LOUIS, MO.

SAN FRANCISCO, CALIF.

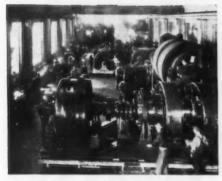
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Service · Quality · Dependability



DEPENDABLE RE-NU-BILT EQUIPMENT!

Only Partial Listings from Stock



General View of shop where equipment is RE-NU-BILT. In foreground a 2000 KW—3 unit mg set recently assembled and furnished to a A-1-a Defense Project.



2-1500 KW G.E. motor generator sets 600 V D.C., with 6600 V 3 60 cy syn. motors. Available for prompt shipment.



3-1000 Kva G.E. Transformer Units are RE-NU-BILT ready to do their part in National Defense. Duplicate bank in stock.

MOTOR GENERATOR SETS

3 Phase—60 Cycle 2—1500 KW G.E. 600 v. Gen d.c. to 2100 HP 6600 v.

syn.	mote	10									
2 - 100	0 KW	G.E.	250	V.	Gen	d.c.	to	1400	HP	11000	V.
	mote										
1500	KW	G.E.	600	V.	Gen	d.c.	to	700	HP	13200	V.
syn.	moto	36									

1 - 500	KW G.E.	600	8.	Gen	d.c.	to	700	HP	2300	V.
syn.	motor									
1-400	KW G.E.	275	¥.	Gen	d.c.	to	600	HP	2300	V.
syn.	motor									
0 200	ECSE: 43 12	000		Com	4 -	4	400	EXTY	10000	

2 - 300	KW	G.E.	600	V.	Gen	d.c.	to	435	HP	10000	¥
syn.	mote	70									
1 - 250	KW	G.E.	275	V.	Gen	d.c.	to	350	HP	4600	V.
03/23	mote	O.P.									

	KW Rid	g. 275	v. Ger	d.c. to	300	HP	2300) v.
	motor							_
2 - 200	KW AL	Ch. 3	units:	2 - 100	KW	250	V.	Gen

2—200 KW Al. Ch. 3 units: 2—100 KW 250 v. Gen de. to 220 KVA 2200 v. syn. motor 1—150 KW Ridg. 275 v. Gen d.c. to 230 HP 2300 v. syn. motor 1—125 KW G.E. 250 v. Gen d.c. to 190 HP 2200 v.

syn. motor 1—100 KW Whse 125 v. Gen d.c. to 150 HP 440 v. sq. cg.

MOTOR GENERATOR SETS

		3	Pho	ise	-2	5 C	ye	le			
1-2000	KW	Al.	Ch.	250	v. G	en d.	c.	to 28	00	HP	6600
1-300		G.E.	600	V.	Gen	d.c.	to	435	HP	23	00 v.
1250	KW moto	G.E.	275	F.	Gen	d.c.	to	390	HP	66	3 00

TRANSFORMERS Power and Distribution

	KVA	Make	Phase	Type	Voltages
1	1250	Whse.	3	Auto	4000x2300
4-	1000	G.E.	1	HKDD	13800x2300
3-	333	Pitts	1	OISC	13800x440/220
3-	250	Moloney	1	C	13800x440/220
3-	200	G.E.	1	HKDD	13800x575
3-	100	Whse.	1°	OISC	13200x250
3-	75	Moloney	1	HE	440x110/220

DC MOTORS

	Special									
Hp	Make	Type	Volts	Speed						
1-3000	Whse.	Interpole	600	50/70						
11500	Whse.	Interpole	600	330						
1 800	G.E.	Interpole	550	600						
1 600	G.E.	MPC	550	600/750						
1 300	Whse.	Interpole	550	300/500						
1- 50	El. Dy.	Interpole	550	194/775						

DC MOTORS 230 Volt—Constant Spec

Hp	Make	Type	Speed
-300	Cr.Wh.	CCM-108H	550
-250	Al.Ch.		525
2-200	Whse.	SK	400
1-200	G.E.	DMC	475

D C MOTORS (Cont.)

	230 Volt-	-Constant	Speed
Нр	Make	Type	Speed
1 - 150	G.E.	MPC	275
1 - 140	G.E.	MDS-108	410
1 - 125	G.E.	CDP-123	1750
1- 75	Cr.Wh.	CMC-65H	600

ADJUSTABLE SPEED

-			
Нр	Make	Type	Speed
1-600	Whse.		150/275
1-300	G.E.	MPC	250/400
2 - 275	G.E.	DMC	500/750
1 - 200	Whse.		400/500
1-150	G.E.	MPC	250/450
2 - 100	G.E.	CD-123	1150/1450
1- 75	Cr.Wh.	65H	600/1200
1- 75	G.E.	C	500/1000
2-60	El.Dy.	S	525/1050
4- 50	Cr. Wh.	CMC	300/900
1-30	Whse.	SK	575/1150
1 - 25	Cr.Wh.	50H	335/1000

A C MOTORS

3 Phase—60 Cycle Synchronous

Make	Type	Volts	Speed
G.E.	ATI	2200	360
G.E.	ATI	2300	450
Cr.Wh.	301	2200	600
G.E.	ATI	440 .	600
G.E.	ATI	2300	600
Whse.		440	514
G.E.	TRB	220x440	450
Whse,		2200/550	1800
Whse.		2200/550	1800

HP	Make	Type	Volts	Speed
1-1000	G.E.	IM	2200	720
1- 800	Whse.	Mill	2200	250
1- 600	Whse.	CW .	2200	870
1-450	Whse.	CW	2200	875
1-450	G.E.	MTP	2200	1200
1-400	G.EN.	MT	550/440	300
1-400	Al.Ch.		2300	505
1-300	Al.Ch.	ANY	2200	585
1-300	Whse.	CW	2300	1170
2 - 300	G.E.	IM	2300	585
1- 250	G.E.	MT	4000/2300	257
1 - 250	F.M.	BV	2200	1200
2 - 200	Whse.	CW	2200	514
2 - 150	G.E.	IM	2200	695
1-100	G.E.	IM	550	720

Slip Ring

	Sq	uirrel Co	ige	
- HP	Make	Type	Volts	Speed
1- 500	G.E.	1-17B	2200	690
1-400	G.E.	KT	2300	585
1-300	Whse.	CS	550	580
2 - 300	G.E.	1k	2300	600
2 - 300	G.E.	1K	440	600
1 250	Al.Ch.		220/440	1150
1 - 200	Whse.	CS	550	720
1 150	G.E.	1K	2200/440	900
3- 150	Al.Ch.	AN	220/440	1750
0 100	187ha a	00	550	1900



What are your requirements? units up to 5000 kw available in stock.



-2150 -2000 - 350 - 300 - 300 - 200 - 150 - 150 - 100

Main Office & Shop: 47 HOWELL ST., JERSEY CITY, N. J.

MOST COMPLETE STOCK IN THE EAST

"all offered in accord with OPM prices"

LATHES

HENDEY 14"x6" Q.C., T.A.

MONARCH 18"x6" Motor-in-Base, Q.C.
LODGE & SHIPLEY 14"x6" Geared Head, Q.C.
DAVIS 12"x5" Q.C.
SIMPLEX 16"x6" Q.C.
ROCKFORD 16"x6" Q.C.
SIDNEY 16"x6" Q.C.
SPRINGFIELD 16"x8" Q.C., T.A.
CHARD 16"x6" Motor-in-Base, Q.C.
LeBLOND 16"x12" Q.C.
JOHNSON JR. 20"x12" Geared Head, Q.C., T.A.
McGARE 26"x46"x12" two-in-one Q.O.
DRAPER 27"x16".
NATIONAL 40"x18" Geared Face Plate

MILLERS

BROWN & SHARPE No. 2A Univ. with Divid. Hds., Vert. MD BROWN & SHARPE No. 2B Plain with Vert. Head, BROWN & SHAWFE No. 20 From MD
CINCINNATI Nos. 1½, and 4 Univ.
GARVIN Nos. 1½, and 2 Univ. complete, MD
BRIDGEPORT Vert. Miller or Jig Borer, 20"x48"
HENDEY-NORTON No. 1½ Univ. with Divid. Hds., MD
KEMPSMITH No. 2 Univ. Miller, complete
BECKER No. 59 Vertical Miller with Rotary Table
INGERSOLL Slab Miller
FOX Millers, power feed, MD

SHAPERS and PLANERS

GOULD & EBERHARDT 16". 20". 24" AMERICAN 28" AMERICAN 24"
SMITH & MILLS 24"
MATTISON 20", MD
CINCINNATI 36"x36"x10' two heads
SELLERS 36"x36"x9' four heads
POWELL 36"x36"x8'

SCREW MACHINES

GRIDLEY Four Spindle 34"
NATL. ACME Four Spindle, Ne. 52
HAYDEN Five Spindle, 34"x3"
CLEVELAND 56", 2½" Single Spindle
BROWN & SHARPE No. 00 cutoff, 20 screw
WARNER & SWASEY No. 8 Turret, 3" hole
WARNER & SWASEY No. 4 Turret
REED-PRENTICE Geared Head Turret, 18" swing
JONES and LAMSON 2½"x24", 3"x36" Turret

DRILLS

FOSDICK 3½' Radial, MD CINCINNATI-BICKFORD 21" Upright, Tapp. Attach. HAMILTON 24" Upright, Tapp. Attach. PRENTICE 26" Upright, Tapp. Attach.

PRESSES

TOLEDO No. 7 OBI Geared, MD
BLISS-CONSOLIDATED No. 8 OBI Geared
BLISS Nos. 18, 19, 19½, 20, 21, 21½ OBI
BLISS Nos. 1, 1½, 3½, 4 and 13 Toggle Draw.
BLISS Nos. 1, 1½, 3½, 4 and 13 Toggle Draw.
BLISS Nos. 1, 2, 4B. 4½ Double Crank
CONSOLIDATED 72" Double Crank Twin Drive
CONSOLIDATED Nos. 24 and 84 Horning
BLISS Nos. 16, 39, 39½ and 49 Horning
CONSOLIDATED 86" width Double Crank Horning
HISGARA No. 86 Double Action OBI
WATERBURY FARREL Eyelet Presses
ADRIANCE No. 406A Arch Geared
WATERBURY FARREL Dial Feed Cartridge Shell
Presses, all long stroke
WATERBURY FARREL Horizontal Rach and Pinion
Shell Reducing Presses
BAIRD No. 3 Tandem Press with Roll Feed

SHEET METAL

NIAGARA 10'x3/16" Shear, MD STOLL 42"x16 gauge Shear

BLISS 30"x14 gauge Shears NIAGARA Circle Shears

CINCINNATI 12'x36" Shears CINCINNATI 14' Press Brake

YODER C36 Gang Siltter, MD
BLISS 225A Gang Siltters
TOLEDO 52" Gang Slitter
TOLEDO 52" Gang Slitter
YODER Twenty Stand Roll Former
KANE & ROACH Seven Stand Roll Former
STANDARD 8"x10" Rolling Mill
BLAKE & JOHNSON 12"x12" Rolling Mill
BRODEN 5"x8" Wire Flattening Mills
OHL 10"x10 gauge Press Brake
VERDES, KAPPES 65" Press Brakes
DREIS & KRUMP 18"x10 gauge Power Box and Pan
Brake Brake
DREIS & KRUMP 8' Hand Box and Pan Brake
DREIS & KRUMP 8' Hand Box and Pan Brake
PELS No. 13 Combination Punch and Shear, with
Coner. MD
RYERSON-KLING Nos. 3, and 4 All Steel Combination Punch and Shears with Copers, MD
WELDERS—820t, Butt and Seam

WIRE WORKING

BAIRD, NILSON and MANVILLE Nos. 1, 2, 3 and 4 Four Slide
SLEEPER & HARTLEY Nos. 0, 2, 2½ and 4 Univ. Spring Coilers
SLEEPER & HARTLEY No. 3 Torsion Spring Winder
SHUSTER, LEWIS and WELLS—Auto. Wire Straightening and Cutting machines, all sizes
WELLS Bed Spring Machinery
WATERBURY FARREL and MANVILLE—Cold Rivet Headers and Thread Rollers
WATERBURY FARREL Wire Drawing
NATIONAL Bent Tappers and Wire Nail Machines
BARRED Wire Making Machine
TORRINGTON and LANGELIER—Wire and Tube
Swedgers

NATIONAL

132-136 Mott Street

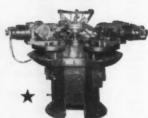
EXCHANGE MACHINERY

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New York, N. Y.



Header: Waterbury-Farrel



Kingsbury Drilling & Tapping

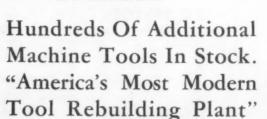


Slab Miller: Niles 36" Horizontal



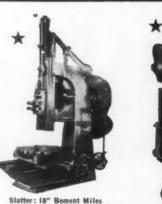
No. 44 Productomatic Miller





BROTHERS, Inc.

NEW HAVEN, CONN.





THE CLEARING HOUSE



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Just a Few Stock Items

METAL WORKING MACHINERY

POWER PLANT EQUIPMENT

BORING MILLS
72" Miles Vert. belt, will swing 84" for height of 12".
100" Niles Vert. belt, 2 heads, max. swing 108".

DRILLS

4' Bickford Radial, belt drive.
12" Sipp, sensitive, mtr. dr. 52 MT.
20-spindle Natce multiple, head 14x27, 52 MT. mtr. dr.
12-spindle Natce multiple, head 13x19½, 51 MT. belt dr.

GRINDERS

20"x144" Landis Piain Cylindrical, mtrzd. 12"x 36" Pratt & Whitney Surface. 12"x 30" Modern Plain Cyl. mtr. dr.

KEYSEATER

22 Baker, cap. 2"x20" belt dr. equip. LATHES

84"x40" Cincinnati Engine Lathe, belt dr. 32"x20" LeBlend, q.e. mtrzd. 22"x24" Ledge & Davis, belt dr. pl. chg. 24"-36"x14" American, qrd. hd. md. taper. 20"x10" Rouisted, semi-q.e. heavy duty, b.d. (8" Steptoe, p.g. cone. 16" Steptoe, b.g. cone.

18"x16' Flather, quick change, b.d. 16"x12' Lodge & Shipley, grd. head, taper, m.d. 14"x8' Walcott, b.g. quick change. 4"-24"x6' Barnes slid. bed. gap, beit dr.

TURRET LATHES

TURRET LATHES
taper, m.d.
tape

PLATE SHOP EQUIPMENT

PIPE MACHINES

1/2"-2" Landis, b.d.

PLANERS

72"x72"x20" Putnam belt, 4 heads.

POWER PRESSES

24 Federal Inclinable, bed 27"x14", stroke
3", cap. 37 tons.

22½6 Brown Inclinable, bed 17"x14", stroke, 7", cap. 25 tons.

SUA PERS

SUA PERS

SUA PERS

SUA PERS

SUA PERS

SUA PERS

PLATE SHOP EQUIPMENT

10" Beloit, 155 comb. cap. punch 1"x34", shear ½x4.

24" Rock River, cap. ½x1½".

34" Hilles & Jones 32 Punch, cap. ½x1.

42" Hilles & Jones 24 Punch, cap. ½x1.

42" Hilles & Jones 24 Punch, cap. ½x1.

42" Hilles & Jones Bending Roll, 1½x9"

rolls, mfr. dr.

18' Wickes Bending Roll, 20"x15" rolls, mtr. dr.

TETA A TAGGATOR

STEAM ENGINE SETS 125 Volt D.C.

10 K.W. G.E. Marine Vertical. 15 K.W. Troy-Engberg Vert. Mar. 20 K.W. G.E. Marine Vertical.

25 K.W. G.E. Marine Vertical. 35 K.W. G.E. Marine Vertical. 100 K.W. Ames Uniflow Horiz. 125 K.W. Skinner Uniflow Horiz. 150 K.W. Harrisburg Uniflow Horiz. 200 K.W. Skinner Uniflow Horiz.

STEAM ENGINE SETS 250 Volt D.C.

450 K.W. Nordberg Uniflow Horiz-300 K.W. Skinner Uniflow 3 wire. 300 K.W. Fitchburg 4 valve. 250 K.W. Harrisburg Uniflow. 400 K.W. Ridgeway 4 valve 3 wire. 50 K.W. Ames Uniflow 3 wire.

AIR COMPRESSORS

AIR COMPRESSORS

1072 Cu.Ft. Sullivan Class WJ3.
888 Cu.Ft. Ingersoil-Rand T. XCB.
676 Cu.Ft. Ingersoil-Rand T. XCB.
600 Cu.Ft. Worthington.
528 Cu.Ft. Ingersoil-Rand 12x10 ER.
368 Cu.Ft. Ingersoil-Rand 12x10 ER.
368 Cu.Ft. Worthington 12x10.
224 Cu.Ft. Chicago Pn. 10x10 NSB.
240 Cu.Ft. Chicago Pn. 10x10 NSB.
240 Cu.Ft. Chicago Pn. 8x8 Dup.
173 Cu.Ft. Ingersoil-Rand 9x8 ER.

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MOREY's Re-Manufacturing Division rebuilds Machine Tools from the frame up, and restores the quality and productivity that were built into the machines by the original manufacturers.

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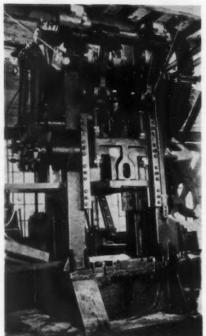
259/2 TOLEDO PRESS. TIE ROD CONSTRUCTION CAPACITY 665 TONS
STROKE 12" CRANKSHAFT 12"
WEIGHT 110,000 LBS.

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TIOGA. ALMOND PHILADELPHIA,

- \$3½ L LaPointe Hydraulic Broaches (new)
- 24" Steinle Turret Lathes
- 3B Foster Turret Lathes

- 2 3B Foster Turret Lathes
 1 2" x 24" Jones and Lamson Turret Lathe
 1 3" x 36" Jones and Lamson Turret Lathe
 1 28" Gisholt Turret Lathe
 2 24" Gisholt Turret Lathe
 1 28" x 10' New Haven Engine Lathe
 1 17" x 6' Le Blond Engine Lathe
 1 17" x 8' Le Blond Production Lathe
 4 25" x 12' Le Blond Heavy Duty GH Production
 Lathes Lathes
- 2 25" x 14' Le Blond Heavy Duty GH Production 25" x 14" Le Blond Heavy Duty GH 1166. Lathes
 No. 2 Warner and Swasey Turret Lathes
 14" x 6' Reed Prentice Geared Head Lathes
 14" x 19" Fay Automatic Lathe
 36" Cincinnati Horizontal Borer
 334" Barrett Horizontal Boring Mill
 Harnischfeger Horizontal Drill and Borer
 Coulter Vertical 2 spindle Diamond Borer

- Coulter Vertical 2 spindle Diamond Borer
 4" Niles Horizontal Boring Mill
 24" x 24" x 6' Ingersoll Slab Mill
 \$1½ Cincinnati Plain Mill
 \$2 Cincinnati Plain Mill
 \$3 Becker Plain Mill

- 1 23/2' Dreses Radial Drill
 1 24/2' American Radial Drill
 1 24/2' Mueller Radial Drill
 1 24/2' Mueller Radial Drill
 1 5' Niles Radial Drill

- 36" Fellows Gear Shaper
- 1 D2 Colburn Drill
- 18" Gleason Gear Generator
- 1 5A Lees Bradner Gear Hobber
- 1 No. 12 Barber Colman Hobber 1 20" Rockford Shaper 1 16" Hendey Shaper

- 1 #2 Bath Universal Grinder
- 1 No. 16A Blanchard Grinder
- 2 No. 65 Heald Grinders
- 1 No. 14 Brown and Sharpe Grinder 1 16" x 60" Modern Plain Grinder 1 Springfield Planer Type Grinder 1 Greenfield Cutter Grinder

- 1 #1F Norton Lapper

- #IF Norton Lapper
 4" Ajax Upsetter

 #0 Ajax Forging Roll
 1" Ajax Hot Headers
 48" x 48" x 16' Pond Planer
 100,000# Riehle Testing Machine
 275 Ton Hydraulic Presses, 4 post type
 Shepard Pinch Bug Riveter
 Williams and White 48" x 11/16" Shear
- Williams and White 48" x 11/16" Shear

 33 Ryerson Friction Saw

 4½" Model H Gridley Chucking Machine

 24" Niles Slotter
- 2A High Speed Hammer
- 3 Spindle Gleason Rougher 36" x 30" x 22' Ingersoll Miller



400 SOUTH CLINTON STREET

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T MACHINERY SPECIAL

AUTOMATICS

Cleveland 1¼, 2 & 2½" Model B. Cleveland 3¼" Model A, M.D. Gridley 2¼, 3¼ & 4¼" S.S. Gridley 1¼" Model F, 4-spdle. Automatic Threading Lathe, 13" x 6" Coulter, G.H. New Britain No. 22.

Cleveland, 4½" Model M Chucker, M.D., 4 spdle.

BORING MILLS

42" Bullard, 2 swivel heads. 54" Niles, 2 swivel heads. Ingersoll Horizontal 6" Bar, 72" Vertical travel, 2 tables 36"x78"x 120" Hydraulic, M.D. Barrett Cylinder, 5"x18' bar.

DRILLS

Cincinnati, 21" Direct Drive, M.D. Edlund No. 1A 4-Spdle., P.F. No. 3 M.T.

Henry & Wright, 1 to 8 spdle. No. 2 M.T.

Natco & Baush Multiple spdle. Morris, 4' Plain Radial.

GEAR MACHINERY

Nos. 3 & 12 Barber-Colman Hobr. No. 6 Fellows Shaper.

Nos. 11, 12 & 16 Brown & Sharpe. Landis, 10x36" Self-Contained. Landis 16"x72" Plain, C/S. Norton 16"x36" Crankshaft. Norton 10x24" Plain & 36". Nos. 2 & 3 Brown & Sharpe Universal.

LATHES

Hendey 14"x5' & 18"x10'. 14"x6' Monarch, M.D. Sundstrand Stub, 8", M.D. 3x36" Jones & Lamson, M.D.

Lapper, No. 15 Norton M.D.

MILLING MACHINES

Brown & Sharpe No. 2 Universal. Brown & Sharpe, #3B Plain, M.D. Cincinnati No. 2 Plain. Becker Vertical Model C.S. 30" Rotary. Table.

Becker Vertical, No. 4B & Model B, M.D.

PRESSES

PG2, P3 & 4, Ferracute, Solid Back. No. 68N Bliss Double Action. No. 94 Bliss, Solid Back. No. 34 Toledo, Solid Back, S.G. No. 77B Niagara, Dble. Crank, S.G.

26"x26"x5' Gray, 1 Head, M.D. 44"x44"x18' Niles, 4 Heads.

30"x30"x8' Cincinnati, 1 Head, MD

PROFILERS

No. 13 Pratt & Whitney S.S.

No. 11/2B, 2 & 3A, & 51/2B High Speed. No. 6 Whiting Stake, 32" throat, 8" Stake.

ROLLS & SHEARS

No. 7 Bertsch, 61/2" Rolls, 6'x1/4" Capacity, M.D. No. 296 Robinson, 8'x No. 14 gauge, M.D.

SHAPERS

16" & 20" Gould & Eberhardt, M.D. 24" Rockford, Hy-Service, S.P.D.

Nos. 1, 2 & 2X Garvin. No. 3 Holmes, 6 spindle.

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42" Niles-Bement-Pond, two swivel 42" Rogers, two swivel heads

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14" Allen Single Spindle
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14" Allen Two Spindle
16" Henry & Wright Two Spindle
20" Leland Gifford Two Spindle
16" Avey Three Spindle
16" Henry & Wright Four Spindle

GEAR MACHINERY

12 Bilton Auto. Gear Miller

3" Gleason Straight Bevel Gear Generator

1" Gleason Straight Bevel Gear Generator

1" Gleason Straight Bevel Hobber

14 Farwell Univ. Gear Hobber

24 Farwell Univ. Gear Hobber

26 Fellows Spur Gear Shaper

2368 Gould & Eberhardt Vert. Spur Gear Cutter, MD

PLAIN CYLINDRICAL GRINDERS

PLAIN CYLINDRIC.
5" x 30" Pratt & Whitney
6" x 32" Norton Type "A"
10" x 18" Norton Type "A"
10" x 24" Landis
12" x 24" Cincinnati

14" x 36"-42" Norton Type "B" Model 81, crank

pin
16" x 48" Landis Crank
18" x 55" Norton Auto-Part Regrinder
20" x 72" Landis Roll
24" x 96" Landis Roll

UNIVERSAL GRINDERS

12" x 60" Brown & Sharpe

SURFACE GRINDERS

225 Heald Rotary
6" x 10" x 36" Norton Type "G"
6" x 10" x 48" Norton Hydraulic
24--60" x 12" Diamond Type "A"

LATHES

14" x 6' Lodge & Shipley

18" x 8' Prentice Geared Head

20" x 12' Lodge & Shipley

26"—48" x 18' McCabe Two-In-One

36" x 18' Bridgeford

36" x 28' Draper

221 Garvin Plain 25 Cincinnati Heavy Duty Plain 26 National Transit Heavy Duty Plain

8" Taylor & Fenn Vertical MD \$4B Becker Vertical \$24" x 6' Ingersoil Openside Planer Type 30" x 6' Ingersoil Openside Planer Type NUT AND BOLT MACHINERY

23½ Waterbury-Farrel DSSD Header 25 Waterbury-Farrel DSSD Header 25 Waterbury-Farrel DSSD Header Eight—23 Manville Auto. Bolt Head Trimmers Four—24 Manville Auto. Bolt Head Trimmers One—2500C Manville Auto. Bolt Head Trimmer

PLANERS 36" x 36" x 12' Detrick & Harvey Openside

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5" x 5" Wire Flattening Mill 12" x 28" Waterbury-Farrel 18" x 36" Waterbury-Farrel

18" x 36" Waterbury-Farrel

CLEVELAND SINGLE SPINDLE SCREW

MACHINES

%"—1¼" Model "A"

1¼" Model "A"

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Three—2¼" Model "A"

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NATIONAL ACME SCREW MACHINES Two-\$53 Four Spindle

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Steptoe Crank Pratt & Whitney Vertical SLOTTERS

8" Betts Vertical 15" Newton Vertical

1" x 10" Pratt & Whitney
Several 2½ x 24 Jones & Lamson
Several 3 x 36 Jones & Lamson
Several 34 x 36" Acme Geared Head
Several—3½ x 36" Acme Geared Head
Universal

1½" Landis Double Head Bolt Threader 8' x ¼" Robinson Press Brake

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COMPRESSORS New and Remanufactured

The country's most diversified stock-Compressor Manufacturers for over 40 years-Engineered and rebuilt by the same personnel that produce our new compressors-visit our plant and see how favorably a reconditioned compressor compares with new.



195 CFM	350 Lbs.	10-9/4	1/2 x9 Penn 12A Steam
360 CFM	100 Lbs.		10 Sul. WH6 Belt
360 CFM	100 Lbs.		8x10 Amer. WTTS St.
458 CFM	100 Lbs.		2 I. R. XCB2 Belt
676 CFM	100 Lbs.		x12 I. R. XRB
868 CFM	100 Lbs.		12 Chi. OCB Belt
870 CFM	100 Lbs.		6x14 I. B. XCB2 Belt
1572 CFM	100 Lbs.		16 PRE2 3-60-440
1500 CFM	100 Lbs.		14x23 I. R. XPV3 St.
4384 CFM	100 Lbs.		221/2x36
1002 02 21	AUG AMB.		oll Rand ORC3 Steam
782 CFM	55 Lbs.	17x12	
880 CFM	40 Lbs.		
745 CFM	30 Lbs.	17x10	Ingersoil Rand ER1
745 CFM	30 Lbs.	17x10	Chicago NSB
690 CFM	40 Lbs.	15x14	Worthington
660 CFM	35 Lbs.	16x10	Pennsylvania 3A
577 CFM	50 Lbs.	15x10	Chicago NSB
550 CFM	100 Lbs.	14x14	Chicago NSB
528 CFM	100 Lbs.		Ingersoll Rand ER1
528 CFM	100 Lbs.	14x12	Pennsylvania 3A
528 CFM	100 Lbs.	14x12	Chicago NSB
508 CFM	60 Lbs.		Ingersoll Rand ER1
477 CFM	35 Lbs.	14x 9	Pennsylvania 3A
450 CFM	35 Lbs.	14x10	Gardner
385 CFM	100 Lbs.	12x12	Gardner
and CEM	TOU LADS.	12312	Caramer

Modern	Plant Do	ing Mo	odern Rebuilding
385 CFM	100 Lbs.	12x12	Pennsylvania 3A
368 CFM	100 Lbs.	12x10	Ingersoll Rand ER1
368 CFM	100 Lbs.	12x10	Chicago NSB
368 CFM	100 Lbs.	12x10	Pennsylvania 3A
368 CFM	100 Lbs.	12x10	American WP
311 CFM	45 Lbs.	12x 8	Ingersoll Rand ER1
311 CFM	45 Lbs.	12x 8	Pennsylvania 3A
311 CFM	45 Lbs.	12x 8	Chicago NSB
311 CFM	45 Lbs.	12x 8	Gardner
309 CFM	100 Lbs.	11x10	Sullivan WG6
309 CFM	100 Lbs.	11x10	Worthington
254 CFM	125 Lbs.	10x10	Ingersoll Rand ER1
254 CFM	125 Lbs.	10x10	Chicago NSB
240 CFM	100 Lbs.	10x 9	Worthington
240 CFM	100 Lbs.	10x 9	Pennsylvania 3A
215 CFM	75 Lbs.	10x '8	Ingersoll Rand ER1
215 CFM	75 Lbs.	10x 8	Pennsylvania 3A
189 CFM	40 Lbs.	10x 6	American WP
173 CFM	100 Lbs.	9x 8	Ingersoll Rand ER1
173 CFM	100 Lbs.	9x 8	Chicago NSB
173 CFM	100 Lbs.	9x 8	Pennsylvania 3A
173 CFM	100 Lbs.	81/2×9	Worthington
136 CFM	125 Lbs.	8x 8	Ingersoll Rand ER1
136 CFM		8x 8	Sullivan WG6
120 CFM		8x 6	Inversoll Rand ER1
120 CFM	60 Lbs.	8x 6	Worthington

THOUSAND SON			The second second
106 CFM	100 Lbs.	7 1/2 x6	Chicago NSB
106 CFM	100 Lbs.	7 1/2 x6	Pennsylvania 3A
92 CFM	100 Lbs.	7x 6	Ingersoll Rand ER1
92 CFM	100 Lbs.	7x 6	Ingersoll ER1 Hopper
92 CFM	100 Lbs.	7x 6	Chicago NSB
92 CFM	100 Lbs.	7x 6	Gardner
92 CFM	100 Lbs.	7x 6	Sullivan WG6
92 CFM	100 Lbs.	7x 6	Pennsylvania 3A
92 CFM	100 Lbs.	7x 6	American WP
88 CFM	60 Lbs.	7x 5	Ingersoll Rand ER1
88 CFM	60 Lbs.	7x 5	Pennsylvania 3A
67 CFM	125 Lbs.	6x 6	Ingersoll Rand ER1
67 CFM	125 Lbs.	6x 6	Chicago NSB
67 CFM	125 Lbs.	6x 6	Sullivan WG6
64 CFM	100 Lbs.	6x 5	Ingersoll Rand ER1
64 CFM	100 Lbs.	6x 5	Pennsylvania 3A
64 CFM	100 Lbs.		American WP
44 CFM	150 Lbs.	5x 5	Pennsylvania 3A
44 CFM	100 Lbs.	5x 4	Ingersoll Rand ER!
44 CFM		5x 4	
28 CFM	150 Lbs.	4x 5	Pennsylvania 3A
622 CFM			
		** *	Frital Chil Lake Assess

30 HP Fairbanks Morse Multi. Cyl. late type. Diesel Engine with Elec. Starter

AMERICAN AIR COMPRESSOR CORP. NORTH BERGEN, N. J.

BUCKETS 1)—34-yd. Hayward, 440-v., 3-PH, 80-CY. (1)—4-yd. Hayward, 230-VDC. (1)—1-yd. Hayward, 230-VDC. (1)—2-yd. single line bucket. (1)—2-yd. single line Brosius. (1)—2-yd., 2-line, Blaw Knox.

TRAVELING GANTRY CRANE

(1)—5-ton Whiting, 50'6" span, 25'0" over hang one end, 37'0" other end, 440-V., 3-PH., 60-CY. STEEL BUILDING & CRANE

(1)—Fabricated Steel Bidg., (practically new), 176'0" long, center bay 51' wide, lean to one side 20'0" wide full length, other side half length with 5-ton cage operated Shepard Crane 49'8" span center bay, 220/3/60-cy., total width building 89'4".

ELECTRIC MONORAIL HOISTS

0 OVERHEAD TRAVELING ELECTRIC BUCKET CRANES (1)—2-yd. Whiting 18'8" span, 230-VDC. 4-motor type, cage operated. (2)—1½-yd. Niles, 55'6" span, 230-VDC. 4-motor type, cage operated.



NOTE: Cranes Marked (x) are single girder motorized bridges, with 2-motor monorall hoists, floor or cage operated. Cranes marked A.C. or D.C. can be furnished rebuilt with either type of electrical equipment.

(2) Indicates Transfer Bridge.

CRANE BRIDGES & TROLLEYS

We have in stock the following Crane Trolleys and with our large stock of crane parts, motors, controllers, etc., we can make up any combination desired.

(2)—15-ton Champion trolleys, 5-ton A.H., 8'0" gauge 100' lift, high speed, 50-HP. M. H., 40-HP. A.H., 7'k-HP. trolley motors, 32 to 50-HP. bridge motors, with end trucks, bridge shafting, gear reduction, etc. (4)—10-ton Shaw Trolleys, otherwise same as above.

We can furnish above trolleys with equipment indicated rebuilt less bridge girders and cages.

(25)—¼ to 3-ton Shepard, 230-VDC., 1-motor. (8)—1 to 3-ton Shepard 230-VDC. 2-motor, floor or cage operated. (10)—1 to 2-ton Sprague, Link Belt, Y&T, 1 & 2 motor, 220-VAC. AIR HOISTS & TROLLEYS (6)—½ to 2-ton Ing. Band & Chicago. (50)—1 to 5-ton 4-wheel 1-B trolleys. (50)—4-wheel American Monorail trolleys.

CRANE AND MILL MOTORS
(230-VDC. SERIES & COMPOUND)
H.P. Make Type
(2)— 1 P & H Size 5½x3½
(1)— 3 G.E. C.O. 2504

C.O. 2504 MT-000 Type Z—262 M.D.P.—2404-A 7 ½ Weatgshe
8 Shaw
9½ G.E.
10 P & H
19 G.E.
19 C.W.
60/80 G.E.
60 Westgshe
65 G.E.
100 G.E. M.D. 2404-A Size 9x5½ M.D. 2406-A B.W. (2-back axle) M.D. 2106 (back axle) K-10 C.O.—1811-A-2 C.O. 1812 MCB—#100

230-VDC. (CONTROLLERS)

(4)— 30 EC&M Type V-2 Dyn. Lowering (5)— 30 EC&M Type V-2 Series (50)—2 to 50-HP. G.E., Westgshe, EC&M, C.H. reversing drum controllers. (15)—5 to 50-HP. Brakes, C.H., G.E. & P.H.

CRANE MOTORS (220/440-V.—3 Ph.—60-Cy.)

(220 H.P. (1)—5 (1)—15 (1)—22 (1)—22 (1)—30 Make G.E. G.E. G.E. G.E. Westgshe G.E. Type MTC-5180 (25-cy.) MTC-5302 1TC-5010 1TC-5011 Type C.I. 1TC-5011 1TC-5011 (25-cy.)

AIR COMPRESSORS

AIR COMPRESSORS

(1)—12x10 Penna, Class 3-A, Cap. 365-CFM. @ 1002, with idler, 60-HP, C.W. slip ring motor, 220/3/60-Cy.

(1)—12x12 Chicago N.S.B. cap. 387-CFM. @ 125 lbs.

(1)—Practically new Ing. Rand P.R.E. serial \$7020 & 1, cap. 770-CFM. @ 100 lbs.. direct connected 125-HP, G.E. Syn. motor, 277-RPM., 2300-V, 3-PH., 60-Cy., after cooler, intercooler, 5-K.W. exciter all piping and P.B. panel.

4302 CLARISSA STREET

WELDERS



1-THOMPSON SEAM WELDER, 400 K.V.A. Serial #12038, type 1042-400, 60 cycle, 440 primary volts, 909 primary amps., pneumatically operated and equipped with extra longitudinal and lateral welding arms, 1 extra upper head, 3'6" throat, designed to weld stainless steel (purchased new in 1937). 1—THOMPSON SPOT WELDER, 300 K.V.A. type spec. 146, 36" throat, pneumatically operated, 440 primary volts, 682 primary amps., 60 cycle (purchased in 1937). With set of Westinghouse ignitron and electronic welding timers, 60 cycle.

1—Thompson Spot Welder, 80 K.V.A. 28" throat, 220-440 volts,

hand operated, serial \$5743.

1—Thompson Spot Welder, 40 K.V.A. portable gun, type 114, 60 cycle, serial \$12046.

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NOW AVAILABLE

BOLT THREADERS - 4" LANDIS; 2" ACME "Class A": 11/2" NATIONAL.

"Class A"; 1½" NATIONAL.

BORING BAR, PORTABLE—3½"-4½" UNDERWOOD, with 4 bars from 6' to 12' long, also guides,
cutter heads, teols, etc.

BORING MILL, VERTICAL—51" BULLARD, 2

heads.

DRILL. RADIAL—3' MUELLER, gear box, SPD, box table, oil-grooved base.

GEAR HOBBER—24" RHENANIA Universal.

HAMMERS, POWER—(2) 500 lb.; 400 lb.; 300 lb.

BEAUDRY "Champlen."

HAMMER, STEAM — 250 lb. NILES-BEMENT-POND.

POND.

IRONWORKERS, COMBINATION — No. MK-10
PELS, armor-plate, with coper, portable, on wheels,
AC-MD, new in 1934; No. 3-R ROCK RIVER,
armor-plate, with coper, AC-MD, new in 1937.

KEYSEATERS—No. 2, No. 1 and No. 0 BAKER;
No. 3 MITTS & MERRILL.

LATHE—39"x20" RAHN - MAYER - CARPENTER,
semi QC, cone.

No. 3 MITTS & MERRILL.

LATHE—39"x20' RAHN - MAYER - CARPENTER, semi QC, cone.

LATHE—30"x16' AMERICAN, 3-step cone, DBG, QC, TAPER, MD.

LATHE—30" x 13' H. S. & G. extra heavy duty, QC, 3-step cone, DBG.

LATHE—8" x 16' WALCOTT, 3-step cone, DBG, QC, TAPER.

LATHE—28" x 16" WALCOTT, 3-step cone, DBG, QC, TAPER.

LATHE—24" x 16" WHITCOMB-BLAISDELL, 4-step cone, DBG, QC, TAPER.

LATHE—21" x 12" LEBLOND, 12-speed, GH, QC, MD, TAPER.

LATHE—20" x 10" LODGE & SHIPLEY, bowl-head, 3-step cone, DBG, QC.

LATHE—18" x 10" LODGE & SHIPLEY, 12-speed selective GH, QC, SPD, TAPER.

LATHE—16" x 8" KIMBALL-WALCOTT, 12-speed GH, pm bed, SPD.

MILLER—26 WHITNEY HAND, AC-MD.

PLANERS — 36" x 36" x 14" W 0 0 D W AR D & POWELL, I rail head, I side head.

PLANERS—36" x 36" x 10" POND, 2 rail heads, 2 side heads.

side heads. ROLL, ANGLE BENDING—6" x 6" x 34" WICKES, AC-MD.

AC-MD. SHAPER—32" STOCKBRIDGE. gear box. SPD, extra high frame, with 71" x 131/2" swiveling milling machine table assembly. SHAPER—24" STEPTOE Heavy Duty, BG, cone. SHAPER—16" SMITH & MILLS, vee-ram, gear box.

m.d.
SHEARS. SQUARING — 10½ x 3/16" SONNTAG
ALL-STEEL: 30" x ½" STOLL, AC-MD.
SHEARS. THROATLESS—½" RYERSON, BD: ¼"
RYERSON, AC-MD.

SHEARS, MISC.—8' x %" LENNOX Rotary Split-ting, AC-MD: 60" YODER Rotary, 14-gauge ca-

paelty.
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RADIAL DRILLS

5' & 6' Fosdick; 6' Western; 5' Bickford 3' & 5' American; 4' Hammond Jackknife 4' Reed Prentice; 4' Niles

GRINDERS

Cyl.: Nos. 3 & 12 Brown & Sharpe; 12"x42" Landis; 10"x24" Norton Centerless: No. 2 Cincinnati, M.D. (2) Surface: Springfield Planer Type; 14" Pratt & Whitney; 15"x15"x8' Norton No. 2 Diamond No. 3 Wilmarth & Morman No. 5 Abrasive

GEAR CUTTER

No. 6A Cincinnati, 20x72" Cap.

LATHES

LATHES

52"x22' Fifield; 36"x28' Bridgeford, g.h., swing 62" with raising blocks
36"x30' & 36"x22' New Haven
36"x16' & 32"x16' Bridgeford
24"x14', 24"x12', 24"x10' American
20"x20' Monarch, g.h.; 20"x12' Wolcott
18"x10' Lodge & Shipley & American
18"x7' and 16"x6' Hendey Yo's Head
15"x8' Sebastian, g.h.; 14"x8' Hendey
Turret: Nos. 2-A, 3-A, 6 Warner & Swascy
24" Gisholt Univ.; 28" Pond, 24" Steinle
22" Libbey; 21" Gisholt

MILLS

Plain: No. 4 Brown & Sharpe: No. 3B K&T; Nos. 2 & 3 Cincinnati; No. 28

K&T; Nos. 2 & 3 Gineman.

Osterlein

Prod. & Planer: Ingersoll, 2 heads, table
30"x144"; 4 heads., 14' bed; No. 2 Kent
Owens; No. 50 Producto-Matic

MILLS

Universal: No. 4 Cincinnati No. 3 GH Hendey & Norton & Brown & No. 2 Garvin and Cleveland Vertical: Nos. 5, 5-C, 6 Becker: No. 2

PLANERS

48"x48"x10' Chichnati & Putnam 36"x36"x14' Detrick Harvey Openside 36"x36"x12' Gray: 36"x36"x8' Niles 36"x36"x10' American; 20' Niles Plate 26"x8' Cleveland Openside

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Priction: Nos. 0, 1, 2, 3, 4, Ryerson Inck: 6x6 and 9x9 Peerless & Racine

SHAPERS

28" G&E Hi-Duty B.G.; 28" Rockford 25" Smith & Mills; 24" G&E, Queen City, Rockford, Ohlo, Cincinnati 16" Steptoe, Rockford, Smith & Mills

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No. 666 Cochran Bly; table 35x63"; M.D.

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PLANERS

PLANERS
36" x 36" x 16' D & H Openside
48" x 48" x 12' N.B.P., Rev. M.D.
52" x 48" x 10' GINCINNATI, 2 heads
60" x 48" x 21' CINCINNATI, 2 heads
84" x 32" x 42' SOUTHWARK, Extra
heavy, 4 heads, Rev. M.D.
60" N.B.P. Rotary, Double head

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2L GISHOLT, 4" hole 4½" x 30" B&O, 5" hole, M.D. 6" x 40" B&O, 7" hole, M.D.

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BORING MACHINES No. 2-5" Bar Barrett

BORING MILLS 30" Bullard 42" Gisholt 14' Sellers

14' Sellers

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1 spdl. Leland-Gifford
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No. 5-D 4 spdl. Molline, Hole Hog
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No. 3 Baush Multiple
No. 3 Baush Multiple
Y Foodick Sensitive
5' Western Heavy Plain
8' Western Heavy Plain
8' Western Heavy Plain

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CAR CUTTERS

No. 2—6" Bilton
No. 12 Barber-Colman Hobber
No. ½ Pfauter Hobber, M.D.
No. 3—26" Brown & Sharpe
No. 4—36" Brown & Sharpe
No. 4—36" Brown & Sharpe
No. 5—48" Brown & Sharpe
No. 5—48" Brown & Sharpe
No. 6—72" Brown & Sharpe
No. 6—72" Brown & Sharpe
No. 6—72" Brown & Sharpe
No. 6—16 The Sharpe
No. 6—16 The Sharpe
No. 6—16 The Sharpe
No. 6—16 The Sharpe
No. 6—16 E Fellower
No. 36-BM Gould & Eberhardt

GRINDERS

INDERS
(See page 551 special advertisement Hill-Clarke Cylindrical Grinders)
No. 18 Bryant Internal
No. 10 Lees-Bradner Spur Gear Grinder
No. 2½ Universal (Bath Type)
No. 5 Springfield Planer Type Surface
No. 2—18" Gardner Dia
24" dia, Cincinnati Face Mill Grinder

LATHES

THES
3½"x38" Fitchburg Lo-Swing
3½"x80" Fitchburg Lo-Swing
3½"x108" Fitchburg Lo-Swing
3½"x108" Fitchburg Lo-Swing
8"x60" Fitchburg Lo-Swing
No. 4-AC LeBlond Auto. Duplex Crankshaft
18"x5" Bradford Geared Head
21"x3" LeBlond
21"x10" LeBlond
20"-40"x10" Rahn-Larmon Geared Head Sliding Bradford
20"x10" Rahn-Larmon Geared Head Sliding Bradford
20"x10" Bradgeford Plain Turning Lathe
30"x12" Whitcomb-Blaisdell

MILLERS

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5" Pratt & Whitney Automatic
Model CS Becker Vertical Continuous Rotary
24"x20' Ingersoll Double Faced, 7 Heads
24"x24"x12' Ingersoll Adj. Rail
36"x36"x12' Newton Duplex
38"x34"x20' Ingersoll Siab
No. 1 Smalley-General Thread

PLANERS

ANERS
24"x24"x 6' Powell
24"x24"x 6' Rockford
24"x24"x 12' Gray
30"x30"x 8' Powell
30"x30"x 8' American, 1 Head
36"x36"x12' American, 2 Heads
36"x36"x12' American, 2 Heads
36"x36"x18' Cincinnati
42"x42"x14' Gray
42"x41' Gray
48"x48"x12' Gray, Rev. M.D. 4 heads

PRESSES
No. 303 Bliss Straight Sided
No. 58 Toledo Nosing
No. 42½ Pels Auto. Beam Shear

SHAPERS

15" Hendey 24" Mark Flather

TURRET LATHES

2\%"\chi26" Greenlee, A. C. & B. F.
3\%"\chi30" Greenlee
3"\chi36" Jones & Lamson, 2 Spdl.
3"\chi36" Pratt & Whitney, A. C. & B. F.
2\sum Giaholt, 3\%" H.S.
2\sum Steinle, 6\%" H.S.

MISCELLANEOUS
No. 7 Burr Keyseater 72" Table Feed
No. 3-B J. N. LaPointe Broach
No. 4-J. N. LaPointe Broach
6" Avey Metal Band Saw
60" Quick Work Rotary Shear
6" Saunders Pipe Machine
12" Bignall & Keeler Pipe Machine

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3' Cincinnati Bickford radial
No. 2 Colburn, single spindle
24" Barnes, power feed
No. 12 Natco Multiple Spindle
No. 13 Natco Multiple Spindle
Three Way Natco Horizontal Multiple
Spindle Spindle

GEAR CUTTERS

No. 10 Lees-Bradner Gear Grinder 15" Gleason Spiral Bevel Generator 18" Gleason Gear Tester

GRINDERS

GRINDERS

No. 2 Cincinnati Centerless

No. 70 Heald Internal

No. 55 Heald Internal

No. 60 Heald Internal

22" x 84" Pratt & Whitney Surface

No. 2 Brown & Sharpe Universal

10" x 20" Landis Cylindrical

16 x 50 Norton Crankshaft

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LATHES

14" x 6' Monarch, c.d. 16" x 6' Lodge & Shipley, c.d. 16" x 8' American, g.h. 18" x 8' Monarch, c.d. 21" x 8' LeBlond, c.d. 18/36" x 12' Rahn Larmon Extension Bed

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TURRET LATHES

TURRET LATHES

No. 1B Foster

Model C 26" Libby, 71/2" hole

No. 2A Warner & Swasey

No. 1 Warner & Swasey

No. 4 Warner & Swasey

No. 7 Bardons & Oliver

No. 9 Bardons & Oliver

21/4 x 24 Jones & Lamson

No. 6A Potter & Johnston Automatic

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No. 3 Cincinnati, c.d.
No. 14A Garvin, c.d.
No. 1 Bristol Hand

MILLS, UNIVERSAL

No. 2 Cincinnati, s.p.d. No. 2A Garvin, c.d.

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PLANERS 30" x 30" x 8' Cincinnati 36" x 36" x 12' Woodward & Powell

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LATHES, MILLING MACHINES, GRINDERS, DRILL PRESSES, SHAPERS, PLANERS, POWER PRESSES, PUNCHES & SHEARS, ELECTRIC WELDERS (Spot & Arc).

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Connected to 10 HP 3 PH 60 CY 220V 3470 RPM motor.

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BECKER No. 2, 3, Vert. Millers HEALD 8", 12", Rotary Grinders ABRASIVE No. 33 Vert. Grinder PRATT & WHITNEY 12" Vert. Grinder Planers 24x24x6' DIAMOND 12x36" Grinder, M.D. JONES & LAMSON 21/4, 3" Turret Lathes BARBER-COLMAN No. 2, 3 Gear

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31/2' MORRIS 4' Mueller Radial Drills M.D.

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HENDEY 14", 16", lathes, yoke Crank Shapers, 14", 16", 20", 24" PRATT & WHITNEY 21/2 x 26" Grd. Hd. Turret Lathe, S.P.D.

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BARDONS & OLIVER 1", 11/2", Turret

BECKER No. 25 Plain Miller FRASER 10" x 36" Cyl. Grinder LODGE & SHIPLEY 14 x 6', 16 x 6', 16 x 8', 30 x 14' Lathes, Geared Head, &

PUTNAM 26" x 18' lathe, M.D. Taper Hydraulic Pumps, Presses, Accumulators THIS IS A PARTIAL LIST.

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2 to 8 volt secondary, with assortment of
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84" x 84" x 18' POND PLANER

3 heads, belt drive

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24" Davis Heavy Duty Turret Lathe

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16", 18" and 24" Shapers

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36" x 36" x 11' Fitchburg Planer, single head

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- 230/460
 1--100 KVA WEM SK 4200 115/230
 1--100 KVA WEM SK 2300 230/460
 2--100 KVA WEM SK 2300 230/460
 1-- 50 KVA WEM SK 4000 110/220
 10--25 KVA G.E. HK 2300 230/460
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 1-22/244
- 2200 1100 122/244 3- 50 KVA G.E. H 2200 1100
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 ELLIOTT MIXED PRESSURE, 3
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 150/2002 pressure condensing, Mixed
 Pressure operation at 22 low pressure.

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md 12"x20".

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25-ton WALKER, 55 ft. span, cab control, with 5-ton Aux. Hoist, 550V. D.C. Motors.
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SCULLY-JONES & COMPANY (Fdry. Div.)

1907 S. Rockwell St., Chicago, III.

OVERHEAD CRANES

No	. Make	Tons	Span	Motors (Control
3	Shaw	2	32' to 42'3"	3-550V.A.C.	Cab
2	Northern	2	37'8"	3-220V.D.C.	Cab
1	Northern	3	37'8"	3-220V.D.C.	Cab
3 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	P & H	5	49'	3-220V.D.C.	
1	Shaw	5	52'	3-440-25cy.A.C	
1	Whiting		32'7"	Motors Missing	
1	Alfred Box	15	33'	3-220V.D.C.	Cab
1	Maris	20	24'	Hand	
1	Case	20		Hand	
1	Toledo	20		4-220V.A.C.60c	y. Cab
1	P&H	25	55'	4-220V.D.C.	
		10 tor	aux.		
1	Sellers	30	66'	Ex Motors	
1	Shaw		34'51/4"	3-220V.D.C.	
1	Runway	10	46' high	187' Long Steel	
16-	-24"-140	21'	Long I Bea	m Girder	

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29" x82" 27%"x29\/x x32\/2 28 x82 29\/x x33\/x 29 x72 29\/x x35 x69\/x 29\/x x35\/x 29\/x x35\/x 29\/x x35\/x 29\/x x35\/x 19\/x x28\/x 19\/x x28\/x 19\/x x28\/x 19\/x x28\/x 19\/x x35\/x 29\/x x35\/x 19\/x x27\/x 19\/x x41\/x 10\/x 15\/x 18\/x 10\/x 10\/x 18\/x 10\/x 10\/x 18\/x 10\/x 10\/x 18\/x 18\/x 10\/x 10\/x 18\/x
ADDRESS BOX W-823 Care The Iron Age. 100 E. 42nd St., New York

ADJUSTABLE SPEED MOTORS

50 H.P. West.S.K. 300/1200 R.P.M. 20 H.P. West.S.K. 500/1500 R.P.M. 10 H.P. West.S.K. 400/1600 R.P.M. 5 H.P. West.S.K. 400/1600 R.P.M. 220 volts D.C. Many others in stock

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OVERHEAD CRANES & HOISTS

20-ton Box, 38'6" space, I-beam girders, 220 vo. D.C. 15-ton P. & H., 91'0" span, 4-meter, box girders, 220 vo. D.C. 10-ton Alliance, 50'0" span, box girders, 220 vo. D.C. 5-ton Roeper Hoist, mono-rail type with geared trolley, 220 V.D.C.

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EQUIPMENT

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RELAYING RAILS—Super-quality machine-reconditioned—not ordinary Relayers.

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16 lb. to 130 lb. New and Relaying Rails complete with angle bars. Spikes, bolts, tie plates, etc. Frog and switch material. All type cars and locomotives. M. K. FRANK

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ALL OFFERS WILL RECEIVE IMMEDIATE CONSIDERATION

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THE IRON AGE, January 1, 1942-559

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IN STEEL WAREHOUSE JOBBING OR EXPORT BUSINESS

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Large Machine and Plate Shop built for servicing gold dredges. Good old style machines, but need reconditioning and modernizing.

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AND MANUFACTURING BUSINESS
II Brown & Sharpe automatic acrew mashines, with
outside feeding and acrew slotting attachments,
plenty of tool holders, collets, feed pushers, and other
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etc. Items with meritfor manufacturing, suitable for defense and non-defense, now being manufactured and sold.
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200 acres finest and hardest ganister rock in Pa. Sale or lease. Cheapest location for quarrying, shipping, coal, water, and electric power.

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This thoroughly organized advertising service of 32 years' recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been \$2,500 or more, send only name and address for details. R. W. Bixby, Inc., 274 Delward Bldg., Buffalo, N. Y.

HELP WANTED

MIDWESTERN DISTRICT MANAGER

Leading nationally known accessory manufacturer, operating in Diesel and internal combustion engine field, wants District Manager to locate in Chicago.

Must have engineering background and proven sales record, preferably in mid-western territory and in Diesel field. Permanent connection for the right man.

Also opening in head office located in East for sales engineering correspondent. Write Box W-836, Care The Iron Age, 100 E. 42nd St., New York, giving full qualifications.

MANUFACTURER WISHES to engage the services of laboratory technician to do research in the development of consumable materials used in the foundry. Address Box W-840, care The Iron Age, 100 E. 42nd St., New York.

HELP WANTED

WIRE MILL SUPERINTENDENT

For non-ferrous and special wire drawing. Experience in quality wire manufacture with well grounded knowledge of die shape, drawing technique and speeds, and temper control essential. All communications held strictly confidential.

ADDRESS BOX W-854
Care The Iron Age, 100 E. 42nd St.. New York

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IRON & STEEL PRODUCTS, Inc. 13496 S. Brainard Ave., Chicago, Illinois Frank Parker, President

EXECUTIVES AND TECHNICAL EXECUTIVES AND TECHNICAL MEN wanted immediately. Top salaries. Write for application. Confidential. Established 26 years. Works managers, factory managers, superintendents, general foremen, process engineers, purchasing agents, personnel directors, chief mechanical engineers, designers and draftsmen—all kinds, industrial engineers. Harrison Personnel Service, 20 W. Jackson Blvd., Chicago, Ill.

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SALES ENGINEER well experienced in the Electric Welded Tube field to organize and supervise the sales of our tube manufacturing department. Address Box W-855, care The Iron Age, 100 E. 42nd St., New York.

ESTIMATOR—on labor steel plate construction, order materials, make sketches, etc. Submit typical itemized labor estimate on welded cone 16' long, 60" diameter one end, 42" diameter other end, ½" plate. Plant twentv miles from New York City. Address Box W-862, care The Iron Age, 100 E. 42nd St., New York.

HELP WANTED

WE WANT AN EXECUTIVE ENGINEER

An engineer who has had a well rounded and varied experience in design and practical engineering practice, who is competent to direct and supervise the design and construction of modern industrial furnaces. He will be associated with one of the largest manufacturers in the field, and if he can qualify, his position will be permanent. Our own employees are aware of this ad. Salary will be commensurate. Give full details of schooling, experience, age, etc., with photo, in first letter.

ADDRESS BOX W-853 Care The Iron Age, 100 E. 42nd St., New York

If you advertise in this section, your "Wants" will be quickly filled.

-NEW YORK AREA SALES-

NEW MACHINE TOOLS ACCOUNTS WANTED

A National Selling Agent of Machine Tools with 97 distributors in the United States. 31 in Canada. and agents in South America, England, Australia, India and Russia, having approximately 750 salesmen, is interested in handling several additional machine tools nationally. If you are looking for a live organization to handle your sales, write **BOX W-795**

Care The Iron Age, 100 E. 42nd St., New York

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PLANT ENGINEER for small firm or Assistant Plant Engineer—large firm. Technical background; many years general construction; some plotting, many years general construction; some plant management, maintenance, and supervision of production in refractories, also plant making cast and malleable iron products. Good character and personality; age 45; married; prefer Phila. area; interview on request. Address Box W-843, care *The Iron Age*, 100 E. 42nd St. New York.

SITUATIONS WANTED

SITUATIONS WANTED

FOUNDRY MANAGER-Ten years experi-FOUNDRY MANAGER—Ten years experience with present employer, five years running large steel and brass foundry in heavy industry. Heat treating knowledge, Jobbing and design consultation experience. Technical graduate—under 40. Wishes to consider change which will offer greater opportunities for the future. Address Box W-845, care The Iron Age, 100 E. 42nd St., New York.

SUPERINTENDENT OR GENERAL FORE-MAN, 40 years of age, twenty years' experience in steel. Natural born mechanic Graduate Industrial and Personnel Management. Studied mechanical engineering, accounting; roller; foreman; assistant superintendent of a small plant. Address Box W-857, care The Iron Age, 100 E. 42nd St., New York.

Salesman-acquainted in Government Procurement Offices in New York-long experience in selling fabricated structural steel and light metal work - can handle war contract and subcontract sales in the Metropolitan Area for reliable structural shop not too far from New York. Straight commission-no draw-no expenses. Address Box W-849, Care The Iron Age, 100 E. 42nd St., New York,

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PROCUREMENT POSITION forging dies or supervision forge die-room and hammer shop. Past experience includes die-sinking and job shop executive. At present, capacity includes quotations and full responsibility die job shop employing twenty men. Married man, forty-two. American born. Address Box W-832, care The Iron Age, 100 E. 42nd St., New York.

FOUNDRY SUPERINTENDENT. Mechanical Engineer ,age 41, with 14 years' of iron foundry supervisory experience desires position as foundry manager or superintendent. Thoroughly familiar with all phases of management and operations of production and jobbing foundries. At present in charge of foundry producing 2400 tons of grey and alloy iron monthly. Eastern location preferred. Address Box W-826, care The Iron Age, 100 E. 42nd St., New York.

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Employment Service Rates Help Wanted Rates Representative Wanted Rates Accounts Wanted Rates

Set solid, 50 words or less \$5.00 Each additional word 10c All capitals, 50 words or less \$6.50
Each additional word 13c

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All capitals, leaded, 50 words or less... \$7.50

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